

Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.

aS441
.N67

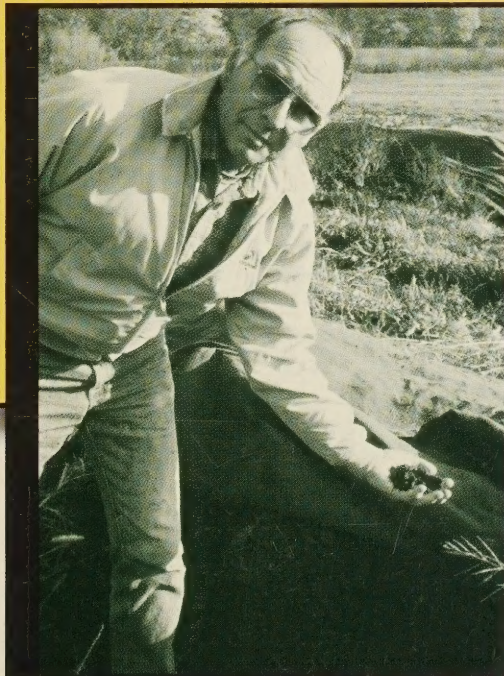
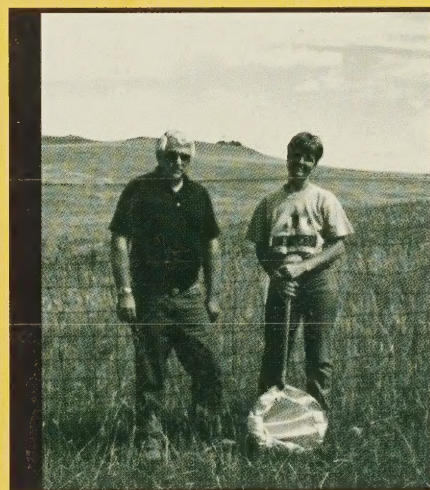
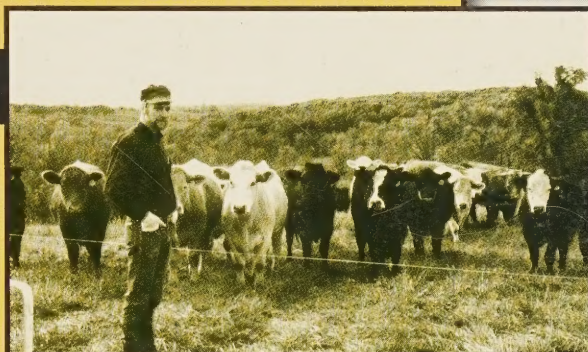
RECEIVED
JUL 01 2011

BY:



North Central Region SARE 1996 Annual Report

Planting New Possibilities



Harvesting a Healthier Future

North Central Region SARE

Sustainable Agriculture Research and Education

1996 Annual Report

This material is based on work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture, under Cooperative Agreement Nos. 92-COOP-1-7266, 94-COOP-1-0809, 95-COOP-1-2002 and 96-COOP-1-3020. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture. • It is the policy of the SARE Program and the University of Nebraska not to discriminate on the basis of gender, age, disability, race, color, religion, marital status, veteran's status, national or ethnic origin or sexual orientation. • The NCR SARE 1996 Annual Report covers activity in calendar year 1996, including Professional Development Program projects from 1994 and 1995. For information on NCR SARE projects or activity, please contact our office at the address below. • This report is printed on recycled paper.

North Central Region SARE Program
University of Nebraska
13A Activities Bldg.
Lincoln, NE 68583-0840
402-472-7081
402-472-0280 (fax)
sare001@unlvm.unl.edu
<http://www.ces.ncsu.edu/ncrsare/>



Credits

Writing, Design and Editing:

Lisa Bauer, NCR SARE Communications Specialist

Cover Design:

Clint Chapman, UNL Graphic Design Specialist

Research and Education Abstracts:

NCR SARE Project Coordinators

Producer Summaries:

Ken Schneider, NCR SARE Project Coordinator/Field Operations

Professional Development Program Abstracts:

NCR SARE Project Coordinators

State Reports:

NCR SARE State Sustainable Agriculture Coordinators

Photography:

Ken Schneider

Picturing Sustainable Farmers Front Cover Photographs

(clockwise left to right)

- Rich Bennett, a Napoleon, Ohio, farmer, examined hairy vetch as a nitrogen-provider in corn production and evaluated a soil test kit for measuring nitrate levels with his 1995 Producer Grant project.
- In Elmer, Mo., farmer Martin Turner used 1995 Producer Grant funds to collect data on soil, forage quality, livestock performance, and financial results in a rotational grazing system.
- A 1994 Producer Grant project, coordinated by Dennis Dietz of Sentinel Butte, N.D., involved the biological control of leafy spurge through flea beetles and grazing sheep. County extension agent Dan Duerre and technician Connie O'Brien are pictured.
- Joe Slater and Bob Wackernagel collaborated on 1994 Producer Grant projects exploring composting livestock manure on their Montague, Mich., dairy farms. Slater is pictured.



Table of Contents

Overview of the Sustainable Agriculture Research and Education (SARE) Program	4
National SARE Staff	5
North Central Region SARE Staff	6
North Central Region SARE Administrative Council	7
Foreword: The '96 Harvest	10
Research and Education Grants	14
Producer Grants	115
Professional Development Program (PDP) Grants	137
North Central Region State Reports	158
Index	177



*We have not
inherited the earth from
our fathers, we are
borrowing it from our
children.*

-Native American Proverb

The USDA's **Sustainable Agriculture Research and Education (SARE)** program is a competitive grants program with regional leadership and decision-making by diverse Administrative Councils. Authorized by the 1985 Farm Bill, SARE was first funded in 1988. The FY 1996 appropriation totaled \$11.5 million; FY 1997 totaled \$11.4 million. SARE's mission is to increase knowledge about, and help farmers and ranchers adopt, more sustainable practices and systems that are profitable, environmentally sound, and beneficial to local communities and society in general. The **Sustainable Agriculture Network (SAN)** is SARE's outreach arm, which disseminates sustainable agriculture information. Also, some SARE projects are funded or co-funded by the EPA's **Agriculture in Concert with the Environment (ACE)** program. The SARE program provides grants for research, education, demonstration and extension projects in three programs:

Research and Education Grant Program: Since 1988, SARE has awarded grants from \$30,000 to \$200,000 to universities, nonprofit groups, government agencies and other entities for multidisciplinary projects involving farmers, Extension and NRCS representatives, scientists, and others exploring sustainable agriculture. Projects generally last one to two years.

Producer Grant Program: In 1992, the North Central Region began offering funds to explore sustainable agriculture on farms. Farmers and ranchers are eligible for these grants ranging from \$500 to \$10,000 to direct on-farm projects.

Professional Development Program (PDP): In order to spread knowledge about sustainable agriculture concepts and practices to Extension and NRCS representatives, SARE started awarding competitive grants to people and groups interested in formulating educational programs. Videos, workshops, on-farm training, and conferences are just a few of the approaches grant recipients have taken to develop sustainable agriculture training.

The SARE program is divided into four regions – Northeast, Western, Southern and **North Central:**

**Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri,
Nebraska, North Dakota, Ohio, South Dakota, Wisconsin**



National SARE Staff

Rob Myers, Director

U.S. Department of Agriculture
1400 Independence Ave., SW Stop 2223
Washington, D.C. 20250-2223
202-720-5384
202-720-6071 (fax)
rmyers@reeusda.gov

Kim Kroll, Associate Director

0322 Symons Hall, Campus Zip 5565
University of Maryland
College Park, MD 20742
301-405-5717
301-314-7373 (fax)
kkroll@asrr.arsusda.gov

Valerie Berton, Communications Specialist

(address same as above)
301-405-3186
301-314-7373 (fax)
vberton@wam.umd.edu

Andy Clark, Coordinator

Sustainable Agriculture Network (SAN)
Alternative Farming Information Center
10301 Baltimore Ave., Room 304
Beltsville, MD 20705-2351
301-504-6425
301-504-6409 (fax)
san@nal.usda.gov

Jerry DeWitt, National Extension Liaison

Iowa State University
Department of Entomology
2104 Agronomy Hall
Ames, IA 50011
515-294-1923
515-294-9985 (fax)
xlde Witt@exnet.iastate.edu



NCR SARE Staff

Steve Waller, *Regional Coordinator*

University of Nebraska
13A Activities Bldg.
Lincoln, NE 68583-0840
402-472-7081
402-472-0280 (fax)
sare001@unlvm.unl.edu

Elbert Dickey, *Regional Extension Coordinator*

University of Nebraska
211 Agricultural Hall
Lincoln, NE 68583-0840
402-472-2966
402-472-5557 (fax)
coex010@unlvm.unl.edu

George Bird, *Professional Development Program Coordinator*

Michigan State University
Department of Entomology
Room 243 Natural Science Bldg.
East Lansing, MI 48824
517-353-3890
517-353-4354 (fax)
bird@msuces.canr.msu.edu

Ken Schneider, *Program Coordinator/Field Operations*

(address same as Steve Waller above)
402-472-0809
402-472-0280 (fax)
sare004@unlvm.unl.edu

Lisa Bauer, *Communications Specialist*

(address same as Steve Waller above)
402-472-0265
402-472-0280 (fax)
sare003@unlvm.unl.edu

Margo McKendree, *Administrative Assistant*

(address same as Steve Waller above)
402-472-0266
402-472-0280 (fax)
sare002@unlvm.unl.edu



NCR Administrative Council

1995-1996 Representation and Contact Information

STATE REPRESENTATIVES

Illinois

A. Ann Sorensen

Center for Ag in the Environment
P.O. Box 987
DeKalb, IL 60115
815-753-9347
815-753-2305 (fax)
asorensen@niu.edu

Indiana

Dave Forgey

Forgey's River-View Farm, Inc.
6032 W. Georgetown Road
Logansport, IN 46947

Iowa

Gordon Bultena

Iowa State University
Department of Sociology
Ames, IA 50011-1070
515-294-1821
515-294-2303 (fax)
gbultena@iastate.edu

Kansas

Alan Schlegel

Kansas State University
Route 1, Box 148
Tribune, KS 67879
316-376-4761
316-376-2278 (fax)
aschlege@oznet.ksu.edu

Michigan

Tom Guthrie

7301 Milo
Delton, MI 49046
616-623-2255
616-623-5038 (fax)

Minnesota

Bill Wilcke (Don Olson)

University of Minnesota
Extension/Research
1390 Eckles Ave.
St. Paul, MN 55108-6005
612-625-8205
612-624-3005 (fax)
wwilcke@mes.umn.edu

Missouri

Frieda Eivazi

Lincoln University
212 Foster Hall
Jefferson City, MO 65102
314-681-5461
314-681-5548 (fax)

Nebraska

John Allen

University of Nebraska
58C Filley Hall
Lincoln, NE 68583-0922
402-472-8012
402-472-0688 (fax)
agec008@unlvm.unl.edu

North Dakota

Bradley Brummond

Walsh County Extension
County Road 12B
P.O. Box 29
Park River, ND 58270
701-284-6248
701-284-7383 (fax)



NCR Administrative Council

*Thank you,
Administrative Council and
Technical Committee
members, for your
contributions to the North
Central Region !*

Ohio

Molly Bartlett

Silver Creek Farm
7097 Allyn Road
P.O. Box 254
Hiram, OH 44234
216-569-3487
216-569-7076 (fax)
t.bartlett@csuohio.edu

South Dakota

Doug Zalesky

West River Agricultural Center
1905 Plaza Blvd.
Rapid City, SD 57702
605-394-2236
605-394-6607 (fax)
dzalesky@silver.sdsmt.edu

Wisconsin

Birl Lowery

University of Wisconsin
Department of Soil Science
1525 Observatory Drive
Madison, WI 53706-1299
608-262-2752
608-265-2595 (fax)
blowery@facstaff.wisc.edu

REGIONAL REPRESENTATIVES

U.S. Geological Survey

Fred Madison

Wisconsin Geological
and Natural History
3817 Mineral Point Road
Madison, WI 53705
608-263-4004
608-262-8086 (fax)

Agribusiness

Dave Swaim

Swaim and Associates
Agronomic Consulting
1730 Camp Rotary Road
Crawfordsville, IN 47933
317-362-4946
317-361-9096 (fax)
dswaim@tctc.com

State Agency

Mary Hanks

Minnesota Dept. of Agriculture
90 West Plat Blvd.
St. Paul, MN 55107
612-296-1277
612-297-7678 (fax)
mhanks@mdais.mda.state.mn.us

Foundation

Oran Hesterman

Food Systems and Rural
Development Program
W.K. Kellogg Foundation
One Michigan Ave. E.
Battle Creek, MI 49017
616-968-1611
616-968-0413 (fax)
obh@wkkf.sprint.com

North Central Deans

Elbert Dickey

University of Nebraska
211 Agricultural Hall
Lincoln, NE 68583-0703
402-472-2966
402-472-5557 (fax)
coex010@unlvm.unl.edu



NCR Administrative Council

*U.S. Natural Resources
Conservation Service*

Donald Pettit

NRCS
2820 Walton Commons W.
Suite 123
Madison, WI 53704
608-224-3000

U.S. Agricultural Research Service

Eldean Gerloff

USDA ARS MA
1815 N. University St.
Peoria, IL 61604

Past Administrative Council Chair

Rick Klemme

University of Wisconsin
Center for Integrated
Agricultural Systems
146 Agricultural Hall
Madison, WI 53706

Technical Committee Co-Chairs

Charles Shapiro

Northeast Research
and Extension Center
5790 S. 886 Road
P.O. Box 111
Concord, NE 68728-0111

Julie Elfving

U.S. EPA Region 7
726 Minnesota Ave.
Kansas City, KS 66101
913-551-7475
913-551-7765 (fax)
elfving.julie@epamail.epa

NATIONAL REPRESENTATIVES

*U.S. Cooperative State Research,
Education and Extension Service*

Jerry DeWitt

Iowa State University
2104 Agronomy Hall
Ames, IA 5001
515-294-1923
515-294-9985 (fax)
x1dewitt@exnet.iastate.edu

Rob Myers

U.S. Department of Agriculture
1400 Independence Ave.
SW Stop 2223
Washington, D.C. 20250-2223
202-720-5384
202-720-6071 (fax)
rmyers@reeusda.gov

U.S. Environmental Protection Agency

Harry Wells

U.S. EPA
401 M St. S.W., MC 7501 W.
Washington, D.C. 20460
703-308-8139
703-308-7026 (fax)
wells.harry@epamail.epa.gov



Foreword: The '96 Harvest

In September 1995, Secretary of Agriculture Dan Glickman released a memo garnering support for "sustainable agriculture" in the USDA. This marked a historic step forward for the sustainable agriculture community – and the SARE program. The North Central Region (NCR) SARE program forged ahead in 1996 to reinforce Glickman's support of an economically viable, environmentally sound, socially responsible agricultural system. We hope this report provides you with a good overview of our 1996 accomplishments.

Before sharing the harvest, it's important to note that achievements in the NCR SARE program were made by a diverse group of people – from farmers in fields to researchers in labs to educators in classrooms, and many others – and we are indebted to their dedication to agriculture sustainability. Through our three grant programs, these people asked important questions about farm and ranch profit, environmental stewardship and community vitality. Two other groups that fuel NCR SARE's progress are the NCR SARE Administrative Council and the Technical Committee, with wide regional representation. They pioneered many innovations to enhance NCR SARE's operation.

*... achievements in the
NCR SARE program
were made by a diverse
group of people – from
farmers in fields to
researchers in labs to
educators in classrooms,
and many others ...*

The NCR SARE program funded 17 new **Research and Education Program** projects in 1996. (Planning grants, enabling project coordinators to better develop proposals before submitting them for funding, have also been introduced into our research and education project portfolio.) Efforts planted seeds of thought in many realms of sustainable agriculture – such as an initiative to increase rural women's leadership in Nebraska, a demonstration project on multiuse border lands, a study to develop sustainable hog markets for families in Missouri and a compilation of indicators for whole-farm monitoring. These 1996-funded projects, as well as continuing grants from previous years, bring important questions to the forefront of agricultural research in universities and organizations. Our 1996 project portfolio, elaborated on in this report, includes team efforts to explore a variety of topics: wildlife habitat, biological control of weeds and pests, soil quality, marketing, grazing, holistic farm management, farm diversification, networking, and projects involving youth and exploring quality of life on-farm and in rural areas.

The 1996 SARE Research and Education Program Project Priority Areas were: 1) Sustainable Agriculture Curriculum Development; 2) Alternative Weed Management Systems; 3) Agriculture Networks; 4) Value-Added



The '96 Harvest

*In our ground-breaking
Producer Grant Program —
started in 1992 by this
region — we continue to
support sustainable
agriculture endeavors
of farmers and ranchers.*

Marketing; 5) Sustainable Livestock Systems; and 6) Emerging Issues. The 1997 SARE Project Priority Areas are: 1) Emerging Issues; 2) Networking; 3) Food Systems; 4) Sustainable Livestock Systems; 5) Integration and Diversification of Farming Systems; 6) Environmentally Sound Management Practices; and 7) Environmentally Sensitive Land and Water Resources.

In our ground-breaking **Producer Grant Program** — started in 1992 by this region — we continue to support sustainable agriculture endeavors of farmers and ranchers. In addition to funding 33 producer projects in our 12 states this past year, the NCR SARE program maintains a full-time producer grant liaison who travels thousands of miles in his pickup truck each summer to visit and assist our participating producers. In 1996, he conducted workshops on the Producer Grant Program in North Dakota and Ohio and discussed sustainable agriculture with touring agricultural representatives from Chile and Hungary. He also conducted a minisurvey, covering producers' sources of information and linkage with other producers. In producer program evaluation forms filled out by farmers and ranchers, 86 percent of the ratings declared the producer program "above average."

The NCR SARE **Professional Development Program (PDP)** — initiated in 1994 to educate extensionists and others in sustainable agriculture — underwent important changes in 1996. The PDP was integrated into the host institution in Lincoln, where we disbursed and received 1997 calls for proposals. In 1996, 10 PDP projects were funded. Our flagship regional training program continues to gather rave reviews. Also, to facilitate better internal communication and foster extension/research/producer relationships, PDP representatives attended a November Administrative Council meeting.

In other communications endeavors, NCR SARE plowed new ground to promote the program and sustainable agriculture. We hired a full-time Communications Specialist who collects and disseminates information in various forms on NCR SARE and sustainable agriculture. The Communications Specialist has traveled and presented SARE information to groups throughout the region since her arrival in July 1996. And a beefed up mailing list of agricultural organizations, media outlets and other contacts has been utilized for news releases and other information. A new NCR SARE display, depicting sustainable agriculture and SARE, was shipped free of charge to meetings and conferences throughout our region. And we still provide



The '96 Harvest

sustainable agriculture experts through our Speakers Bureau. This Annual Report is another regional communications vehicle.

Electronically, our region is creating a presence on the World Wide Web and answering information requests via email. The national SARE program's outreach arm, the Sustainable Agriculture Network (SAN), redesigned its web page at <http://www.ces.ncsu.edu/san/>. The NCR SARE program is featured on the SAN page, but also has a separate existence in cyberspace at <http://www.ces.ncsu.edu/ncrsare/>. Internally, we created mail lists for electronic dialogues among the Administrative Council and various Professional Development Program groups. But although our office is online, we realize not all of our audience is "connected," so we haven't closed off information flow to people on our regional country roads.

In addition to a new Communications Specialist, our office now has an Administrative Assistant who, among a host of duties, is creating and maintaining a database of NCR SARE projects. This will give us easier access to our research and education efforts and provide interested parties with answers to questions such as, "How many rotational grazing Research and Education projects have been funded in Missouri?" or "What are all of the projects funded in the past three years in Ohio and Indiana?"

In 1996, Administrative Council members began organizing site evaluations of Research and Education projects.

Our Administrative Council continues to support sustainable agriculture research and education in creative ways. The Council disbursed \$13,000 to each NCR state for implementation of state sustainable agriculture conferences. For instance, in early March, North Dakota and South Dakota pooled their state conference resources to host *21st Century Agriculture – Creating a Sustainable Future*, in Aberdeen, S.D. Farmers, ranchers, researchers, educators, conservationists and others attended the two-day event to discuss a broad range of sustainable agriculture topics – from beef marketing to economic effects of wetlands to sustainable communities. Also in 1996, Administrative Council members began organizing site evaluations of Research and Education projects.

With our region comprising 45 percent of farm operators; 41 percent of farms; 54 percent of total cropland; 41 percent of agricultural products sold; and a very high percentage of major crops in the U.S., it's not a matter of pride that the NCR SARE program plow forward in sustainable agriculture research and education – it's imperative. The investment we make in alternative ways of thinking about our agricultural system has broad implica-



The '96 Harvest

*The investment we make
in alternative ways of
thinking about our
agricultural system has
broad implications for a
healthy, bountiful future.*

tions for a healthy, bountiful future. Whether it's a producer studying alternative cover crops, an Extension specialist attending a workshop on whole-farm planning, or a nonprofit group establishing a coop to market grass-fed beef, it's a part of an ever-growing, influential network of people who care about the way we grow our food. We hope you see the value of these individuals and groups and continue to follow our progress and support our efforts.

Tips and Explanations How to Use this Report

Whether you are keeping the NCR SARE Annual Report on your bookshelf to refer to from time to time or reading it cover to cover, you need to know definitions of our "codes" and acronyms. (For a program explanation, see page 4.)

Project Numbers ... "LNC" or "ANC" in the Research section, "FNC" in the Producer section, and "ENC" in the Professional Development section; numbers such as LNC 92-11.1 indicate a renewed or continued project

ANC ... ACE-funded projects
LNC, FNC ... SARE-funded projects
ENC ... PDP-funded projects

States ... two-letter codes, *i.e.*
MI=Michigan

Proposal/Annual Report/Final Report
... the stage that Research and Education projects are in, *i.e.*
Proposal=newly funded,
Annual=progress report, and
Final=completed project report

SARE ... the USDA Sustainable Agriculture Research and Education Program

SAN ... the Sustainable Agriculture Network, SARE's outreach arm

ACE ... the joint USDA/EPA Agriculture in Concert with the Environment Program

PDP ... the SARE Professional Development Program

NCR ... the North Central Region: 12 states listed on page 4

CES ... the USDA Cooperative Extension Service

NRCS ... the USDA Natural Resources Conservation Service

ARS ... the USDA Agricultural Research Service

ANR ... the USDA/CES Agriculture and Natural Resources Program Leaders



Research and Education Grants

ILLINOIS:

Microbial Indices of Soil Quality	16
On-Farm Adaptation of Integrated Crop and Livestock Systems in Illinois	17
Utilization of Oilseed Rape as a Biocontrol Agent for Nematodes Parasitizing Corn in Illinois	18

INDIANA:

Sustaining Row Crop and Fine Hardwood Productivity through Alley Cropping:	
On-Farm Demonstration, Research, and Economic Evaluation of an Integrated Low-Input System.	19
Reducing Herbicide Use with Machine Vision Technology	20
Evaluation of Composted Manure as a Growth and Delivery Substrate	
for the Biological Weed Control Agent <i>Gliocladium virens</i> in Sustainable Vegetable Production Systems	21
Multiple-Use Borderlands: An Education and Demonstration Project	22

IOWA:

On-Farm Research and Demonstration of Ridge Tillage for Sustainable Agriculture	23
Investigation of the Viability of Growing Herbs as Alternative Crops for Iowa Farmers	24
Production of a Videotape Series Demonstrating Improved Grazing Practices to Promote	
Forage-Based Livestock Production in the Upper Midwest	25
An Integrated Riparian Management System to Control Agricultural Pollution and Enhance Wildlife Habitat	26
On-Farm Evaluation of <i>Beauveria bassiana</i> for Long-Term Suppression of the European Corn Borer	
in Midwestern Cropping Systems	27
Importing a Sustainable Model of Feeder Pig Production from Sweden: A Cooperative Project	28
FFA Participation in On-Farm Demonstrations of New Tools for Optimizing Use of Animal Manures in Crop Production	29
Regional Inventory and Assessment Project (Quality of Life)	30
The Adams County CRP Research and Demonstration Project	32

KANSAS:

Assessing the Potential for Biological Control of Field Bindweed <i>Convolvulus arvensis</i> with the Gall Mite	
<i>Aceria malherbe</i> and the Moth <i>Tyta luctuosa</i>	33
Development of a Rancher Cooperative to Market Grass-Fed Meat	34
Farmer-to-Farmer Cover Crop Network Complementing On-Farm and On-Station Trials	36
Bioremediation of Saline Seeps	37
Farmer Marketing Information Coops	38

MICHIGAN:

Integrated System for Sustainability of High-Value Field Crops	39
Reduced Tillage and Fungicide Input for Enhanced Sustainability in Fresh Market Tomato Production	40
Michigan 1995 Late Blight Education and Management Plan	41
Domestic Birds as Weed and Insect Pest Biocontrol Agents: Field Experimentation and On-Farm Evaluation	43
Ecological Principles of Habitat Management for Weed and Insect Biological Control	44

MINNESOTA:

Annual Medics: New Legumes for Sustainable Farming Systems in the Midwest	45
Future Farmers in Sustainable Agriculture	46
Biological, Financial, and Social Monitoring to Develop Highly Sustainable Farming Systems	47
Weed Control for More Sustainable Soybean Production	48
Obstacles to Market Access for Family Farm Hog Producers	49
Experiential Learning Activities for an Undergraduate Minor in Sustainable Agriculture Systems	50
Packaging, Testing, and Disseminating a Set of Indicators for Ecological, Financial, and Social Monitoring on Farms	51
People to People: Sustainable Agriculture Networking for Farmers and Rural Communities	52



Research and Education Grants

MISSOURI:

Pasture-Based Beef Finishing Systems	53
Fresh to Processed: Adding Value for Specialty Markets	54
Developing Sustainable Hog Markets and Slaughtering Arrangements for Family Farmers in Missouri	55

NEBRASKA:

Impact of Tree Windbreaks on Distribution of Insect Pests and their Natural Enemies in Sustainable Agricultural Systems	56
Low-Input Beef Cattle Systems of Production	57
Sustainable Agriculture Mentor Program	58
Estimation of Reduced Machinery Ownership Costs in Diversified Cropping Systems	59
Quality of Life Effects of Conventional, Transitional, and Sustainable Production Systems on Rural Communities and Family Farms in the Western Corn Belt	60
Comparing Farming Systems with Different Strategies and Input Levels: A Research/Education Program with Replicated Micro-Farms	61
Improving Sustainability of Cow-Calf Operations with Natural Forage Systems	62
Nebraska Agriculture IMPACT Project	63
Integration of Indigenous Knowledge of Sustainable Agricultural Systems	64
Increasing Rural Women's Leadership in Sustainable Agriculture and Community Development	65
Biologically Intensive Pest Management of Greenbugs, <i>Schizaphis Graminum</i> (Rondani), on Grain Sorghum	66

NORTH DAKOTA:

Wildlife Values of Sustainable Agriculture Practices in the Northern Great Plains	67
---	----

OHIO:

Further Development of Innovative and Practical Education in Sustainable Agriculture in Ohio	68
Development and Evaluation of Bio-Cultural Weed Management Systems for Low-Till Grain Production	69
Evaluating Soil Organic Matter and Soil Biology for Improving Short- and Long-Term Management of Soil Nitrogen Supplying Capacity	70
The Role of Soil Management in Crop Nutritional Quality and Susceptibility to Pests	71
Economic and Ecological Analyses of Farms and their Component Practices to Promote Diversification through Crop Rotation and Cover Crop Systems	72
Integrating Quality of Life, Economic, and Environmental Issues: Agroecosystem Analysis of Amish Farming	73
Biological Control of Foliar Diseases and Fruit Rots of Tomato	74

SOUTH DAKOTA:

Impacts of Agricultural Management Systems on Economic, Environmental, and Wildlife Values of Altered and Unaltered Wetland Areas	75
Economic and Environmental Implications of 1990 Farm Bill Sustainability Provisions in Water Quality Sensitive Areas	76
The Effect of Spring-Seeded Annual Medic on Weed Management and Soil Quality in Corn Production	77
Agricultural Wetland Management	78
Restoration of Economic and Ecological Sustainability in Western Rangeland: A Handbook	79

WISCONSIN:

Whole-Farm Nutrient and Agricultural Chemical Input Budgeting for Sustainable Farming: Analysis and Demonstration	80
A Biological Control Network for the Sweet Clover Weevil and Clover Root Curculio	81
Sustainable Community Values Project – Phase II: Community Supported Agriculture and Quality of Life	82
Hedgerow Habitat for Enhancing the Impact of Beneficial Insects	83
Impacts of Intensive Rotational Grazing on Stream Ecology and Water Quality	84
Compost Extracts and the Biological Control of Foliar Plant Disease	86
Reduced Chemical Inputs in Alternative Potato Farming Systems	87
Training and Transitioning New Farmers: A Practical Experiment in Farmer Self-Development and Institutional Re-Invention	88

More Information on Research and Education Projects	89
---	----



Microbial Indices of Soil Quality

Proposal

Project Coordinator:

Gerald Sims
University of Illinois (UI)
1102 South Goodwin Ave.
Urbana, IL 61801
217-333-6099
217-333-5251 (fax)
gk-sims@uiuc.edu

Team Members:

UI:

Susanne Aref, Biostatistics
Charlie Boast, Soil Physics
Don Bullock, Crop Production
Gerry Walter, Ag Communications
Michelle Wander, Soil Fertility
Deborah Cavanaugh-Grant,
Illinois Sustainable
Agriculture Network
Dan Anderson,
Farm and Resource Management Lab
Kevin Barber, Soil Fertility
Mark David, Forest Soils
Morris Huck, Soil Science
Don Johnson, Geography
Greg McIsaac, Ag Engineering
Ted Peck, Soil Testing
Jack Paxton, Plant Pathology
David White, Agricultural Economics
Dennis Bowman, Extension Educator
SCS:

Steve Elmer

Bob Mcleese

Dan Towery

OTHER:

Ray Brownfield,
Conservation Technologies Info. Ctr.
Barbara Hill Nowack,
IL Sustainable Agriculture Society
Terry Holsapple, Earthborne Farms
Terry Schneider, Schneider Farm
Keith Waterman,
Farm Manager Heren Fertilizers
Stan Howell,
Lanmark and Agricultural
Conservation & Environmental Co.
Garry Johnson, Farm Management
Jim Cancelli,
IL No-Till Farmers Assoc.
Leon Kohlmeier, Residue Managers
Jack Norman, Sierra Club
Renee Robinson,
Illinois Stewardship Alliance

Funding:

SARE: \$54,000

Duration:

September 1996 - August 1998

Research is proposed to develop microbial indices for soil quality. The approach taken is to focus on anaerobic microbial processes, which have been largely ignored in soil quality research. In addition to addressing important biochemical potential required during temporary flooding conditions common to the North Central Region, the use of anaerobic assays adds the unique advantage of a simpler moisture regime (soils will be flooded) than corresponding aerobic treatments.

The specific objectives of the study are to 1) measure over two seasons several aerobic and anaerobic microbiological processes in soils obtained from 35 differently managed farms representing major geographical regions of Illinois; 2) using data collected through the Illinois Soil Quality Initiative (ISQI); examine relationships among soil biological, chemical, and physical features; and 3) based on the success of biological measures in assessing status of soils under varied farming systems, and the predictive capabilities of chemical and physical measures, develop one or more simple field tests for microbial indices of soil quality. The experimental approach will include the use of on-farm and University of Illinois pilot sites to establish a range of soil quality conditions for examination.

The project personnel for the proposed two year study include two graduate students, one paid entirely through SARE, the other paid largely through a University of Illinois fellowship. The project coordinator and collaborating scientists associated with ISQI require no salary from SARE. The project will be conducted under the umbrella of ISQI, which seeks to develop soil quality indices for Illinois. The on-farm and pilot site sampling program will be coordinated through ISQI, and the ISQI database and project infrastructure will be used to evaluate microbial soil quality indices developed herein. Outreach will be accomplished through the ISQI outreach infrastructure. The practical outcome sought by this project is to promote protection of the soil resource by improving our understanding of the technical and nontechnical issues involved in soil quality issues and to identify soil quality indices that farmers can use to make decisions about their own specific management practices. The project addresses the Environmentally Sound Practices and Emerging Issues Priority Areas of the FY-1996 North Central Region SARE Program. The results of this study and the indices that will be developed, will be of value to farmers, community members, and policy makers, who want to know whether and how agricultural practices affect soil quality.



On-Farm Adaptation of Integrated Crop and Livestock Systems in Illinois

Annual Report

Project Coordinator:
Robert H. Hornbaker
Department of
Agricultural Economics
University of Illinois (UIUC)
305 Mumford Hall
1301 West Gregory Drive
Urbana, IL 61801
217-333-5508
217-333-5538 (fax)
r-hornbaker@uiuc.edu

Team Members:

Jim Kaiser
Extension Forage Specialist
(retired in 1993)

Gary Letterly
Christian County Assistant
for Economic Development
Crops and Horticulture
Extension

Dennis Bowman
Decatur Center Crops
System Educator
Extension

Ed Ballard
Animal Systems Educator
UIUC Extension

Dan Anderson
On-Farm Research Coordinator
UIUC Extension

Funding:
SARE: \$92,994

Duration:
September 1993 - August 1996

The objectives of this project are: 1) Conduct replicated small-scale experiments examining four alternative agricultural production systems involving various combinations of grains, hay, grazed forages, and beef cattle; 2) At the same time, adapt three of these production systems on an essentially full-scale basis, with 40 - 60 acres dedicated to each system; 3) Monitor, analyze and document environmental and economic consequences of all the production systems under study; and 4) Sponsor annual on-farm demonstrations and exhibits, install signs for the benefit of farmers in the county and region, and interpret results in published research and cooperative extension education programs.

The start-up year of the project has been an overall success. The plots for the replicated studies were laid out and the treatments were established. Through the year innumerable lessons were learned about the logistical and technical problems associated with doing interdisciplinary research, from a distance, with the farmer playing an essential role, involving livestock, and producing a crop like alfalfa that does not have a conventional market. In the case of the grazing study, the plots were planted in the fall of 1993, fenced the following spring, facilities for watering and handling (including periodic weighing) the cattle were set up, and the cattle were purchased and installed for the 1994 grazing season. The cattle did very well, but we believe we can do better as we learn how to better stock and manage an intensive grazing system and, perhaps, make other changes to more fully integrate beef production into mixed grain/beef systems. Opportunities exist to increase weight gain within the latter part of the grazing season with supplemental grain or with cool season forages grown as a second crop after wheat.

The lessons learned in the full-scale studies about doing research were primarily ones of learning what roles each of the participants has to play. An early management lesson had to do with how to manage and market hay on what remains a grain farm. Production this first year is felt to have been adequate, but with definite room for improvement as the management structure becomes settled and establishes a working understanding with the operators that will better handle the routine, leaving more time and energy to anticipate the unexpected and be sensitive to opportunities to learn and improve. We are rapidly becoming acquainted with the issues associated with studying and actually managing more complex production systems. The experience of this first year has left an impression more of the opportunities involved than the difficulties.



Utilization of Oilseed Rape as a Biocontrol Agent for Nematodes Parasitizing Corn in Illinois

Annual Report

Project Coordinator:

H. Walker Kirby
Associate Professor
and Extension Specialist
Department of Crop Sciences
University of Illinois
1102 South Goodwin Ave.
Urbana, IL 61801
217-333-8414
217-244-1230 (fax)
KIRBYW@IDEA.AG.UILLUC.EDU

Team Members:

David C. Feltes
IPM Educator
Illinois Cooperative Extension Service

Ron Merema
Farmer
Merema Farms

Funding:
ACE: \$28,909

Duration:
September 1995 - August 1997

Plots were established in May of 1995 to investigate the potential use of oilseed rape as a biocontrol agent for corn nematodes. Current management of nematodes is based upon the use of soil applied insecticide-nematicides which pose a hazard to applicators and have potential for environmental contamination. The major objective of this investigation was to determine if yields could be improved using a cover crop of oilseed rape plus crop rotation to replace dependence on nematicides.

Previous studies have shown that crops of the *Brassica* family release compounds toxic to nematodes which either disked or rototilled as a green manure crop. Plot treatments include continuous corn or a corn/soybean rotation. Counter, a commonly used nematicide was also applied to some corn plots at the recommended rate. Oilseed rape, as a spring crop and a fall cover crop were planted and rototilled into the soil prior to planting of the corn or soybean crops. Normal crop management practices consistent with Illinois production practices were used with all plots. Soil samples for nematode analysis were collected during the growing season on a monthly basis beginning in May of 1995. Samples were taken prior to planting and a final sample 30 days after harvest. Samples were processed using standard methods and plant parasitic nematodes were identified and quantified.

Severe cold weather in the winter of 1995 killed all of the rapeseed and a short-season replacement crop of mustard, cultivar 'forage,' was planted in the early spring of 1996 and rototilled prior to planting of corn or soybeans. Increased corn yields of 12.6 bushels per acre were obtained where continuous corn was planted with the spring mustard and 24.2 bushels per acre where soybeans preceded the planting of mustard compared to two years of corn with no treatment. The nematicide treatment had the best yield at a 61.8 bushel per acre increase compared to continuous corn. Corn/soybean rotation with no mustard treatment was planted to soybeans this year and are not reported. Soybean yields did not show improvement where mustard was planted. Soybean yields have averaged 24 bushels per acre for both years of this study and are not affected by the cover crops.



Sustaining Row Crop and Fine Hardwood Productivity through Alley Cropping: On-Farm Demonstration, Research, and Economic Evaluation of an Integrated Low-Input System.

Final Report

Project Coordinator:
Andrew R. Gillespie
Department of Forestry
and Natural Resources
Purdue University
West Lafayette, IN 47907-1159
317-494-3587
317-496-2422 (fax)
andyg@forest1.fnr.purdue.edu

Team Members: PURDUE:

William Hoover
Professor
Forest Economics

David Mengel
Professor
Agronomy

Otto Doering
Professor
Agriculture Economics

Jack Seifert
Extension Forester

Donald Biehle
Farm Manager

OTHER:
Hugh Pence
Farmer

Lenny Farlee
District Forester
Indiana Department
of Natural Resources

Funding:
SARE: \$123,948

Duration:
September 1994 - January 1997

This project was undertaken to assess the feasibility of using alley cropping agroforestry in the North Central Region to 1) diversify farm incomes and produce needed timber for the wood products industries; 2) protect soil and water resources; and 3) reduce inputs to crop production.

Alley cropping agroforestry is the practice of planting crops or forages in alleys between rows of trees. Historical crop yields in existing alley cropping trials were used to establish research and economic objectives. Case study analyses of a private farm were also undertaken to determine feasibility of alley cropping as a sustainable system. Preliminary analysis in 1995 indicated that tree alleys were encroaching on crops in Purdue's 10 year-old trial. Environmental and physiological measurements also indicated that trees were competing for light and shading crops, lowering yields. This led to the implementation of treatments to separate trees and crops below ground to discern above- and below-ground competition, as described last year.

Results in 1995 showed that water competition below ground was the major factor decreasing plant yields. This appears to have been replicated in 1996 though analyses are still underway. Given this knowledge, economic modeling has shown that management for below-ground competition (disking or knifing periodically to remove tree roots from crop alleys) significantly impacts crop yields and returns to the farmer for the alley cropping system. In many cases, alley cropping is more profitable than traditional farming of row crops. Different scenarios present different returns, but agroforestry, managed properly, can add value and lessen risk for farms.



Reducing Herbicide Use with Machine Vision Technology

Proposal

Project Coordinator:

Harvey A. Holt
Forestry and Natural Resources
1159 Forestry Bldg.
Purdue University
West Lafayette, IN 47907-1159
317-494-3585
317-494-0409 (fax)

Team Members:

PURDUE:
Thomas Jordan
Professor
Department of Botany
and Plant Pathology

Fred Whitford
Director
Purdue Pesticide Programs
Department of Botany
and Plant Pathology

OTHER:

Jim Beck
President
Patchen California, Inc.

Funding:

ACE: \$24,909

Duration:

July 1995 - September 1996

Ballasted sections supporting railroad tracks and the road shoulders of this nation's rural highways are two areas commonly kept free of vegetation for a variety of reasons. There are approximately 140,000 miles of railroads and 3.3 million miles of rural highways in the U.S. (Morgan, 1993; USDA, 1979). Assuming a minimum width of 16 feet for railroads and 4 feet wide shoulders on each side of a road, several million acres are maintained weed-free. Total vegetation control is usually accomplished with combinations of postemergence and preemergence herbicides. Postemergence herbicides control the weeds present but have little environmental persistence. Preemergence herbicides, because of their inherent residual soil activity, have environmental concerns, e.g., ground and surface water contamination, and uptake by roots of nontarget plants located off-site. Reducing the use of preemergence herbicides could be possible if postemergence herbicides could be applied in a more cost effective manner.

Where railroads and highways are treated by commercial applicators, it is not uncommon for the payment to reflect gallons applied, not degree of weed control. This does not promote reduced herbicide use. Machine vision technology enables a spray unit to treat weeds automatically after they are detected. The adoption of machine vision technology will entail changes in the approach to contract herbicide applications to highways and railroads.

This proposed research will examine the operational potential of machine vision spray technology, e.g., the WeedSeeker Sprayer, for railroads and roadsides. This will include determining the effect of weed size and travel speed on sprayer detection. We will compare: 1) a standard residual soil active herbicide combination; 2) a nonresidual, translocated herbicide treatment; and 3) a contact herbicide treatment, the biopesticide pelargonic acid. Weed control will be determined by stem counts in subplots. Amounts of carrier and herbicides will be recorded for each treatment. The WeedSeeker Sprayer has been reported to reduce herbicide use by 75 percent in orchards.



Evaluation of Composted Manure as a Growth and Delivery Substrate for the Biological Weed Control Agent *Gliocladium virens* in Sustainable Vegetable Production Systems

Proposal

Project Coordinator:

Stephen Weller
Purdue Research Foundation
1165 Horticulture Bldg.
Department of Horticulture
West Lafayette, IN 47907-1165
317-494-1333
317-494-0391 (fax)
Steve_Weller@hort.purdue.edu

Team Members:

PURDUE:

K.G. Raghothama
Assistant Professor
Department of Horticulture

Chad Hutchinson
Graduate Student
Department of Horticulture

Rick Foster
Associate Professor
Department of Entomology

Rick Latin
Professor
Department of Botany
and Plant Pathology

Richard Jones
Associate Professor
Department of Botany
and Plant Pathology

Glenn Sullivan
Professor
Department of Horticulture

OTHER:
David and Nina Kent
Farmers

David Swaim
Crop Consultant

Steve Bonney
President
Indiana Sustainable
Agriculture Association

Funding:
SARE: \$70,000

Duration:
September 1996 - August 1998

Weeds are a limiting factor in obtaining optimum yields in most cropping situations. Many farmers rely almost exclusively on chemical herbicides to reduce weeds. Herbicides have improved weed control in many situations, however, not without costs to the environment, society, and human health. This research is designed to fully develop composted chicken manure as a growth and delivery substrate for the weed biological control agent, *Gliocladium virens* and to evaluate its effectiveness on weed control in vegetable production. Our research will compare conventional systems using high chemical inputs with sustainable systems using animal manures, biological pest control agents, and cover crops. Design of production systems using reduced chemical inputs should include considerations of the effect management practices have on the total pest population and crop production. Our secondary focus will be to measure the production system's influence on total pest complexes and crop yield. Our goal is to develop a sustainable vegetable crop production system based on a biological control organism that will reduce synthetic chemical inputs without compromising productivity.

Objectives of this study are: 1) Use composted poultry manure as a substrate for growth and delivery of the weed biological control agent, *Gliocladium virens* in sustainable vegetable production systems; 2) Use annual rye cover crop (*Secale cereale*) in association with *Gliocladium virens* as an alternative to conventional herbicides in vegetable production systems; and 3) Assess the effectiveness of these environmentally friendly production systems and disseminate information to the farming community.

Research will be conducted in the laboratory greenhouse and at field locations. Our initial studies will develop composted manure as a system for delivery of *G. virens* into the field. Tests of its effectiveness against weeds will be confirmed in greenhouse tests. We will also develop integrated, sustainable production systems for pumpkins and snap beans using composted chicken manure as a substrate for growth and delivery of the biological weed control agent *G. virens* and as a nutrient source for crop growth. *G. virens* will also be used with a rye cover crop/mulch system. Pumpkin and snap bean will be grown in a two year rotation. The following treatments will be used in a split-plot design: 1) production with synthetic fertilizers and pesticides; 2) production with composted chicken manure and synthetic pesticides as needed; and 3) production with composted chicken manure inoculated with *G. virens* and synthetic pesticides as needed. These three treatments will be replicated in both a bare ground tillage system and a fall-seeded rye cover crop system.

This proposal brings together farmers, agricultural consultants, sustainable agriculture experts, university researchers and extension specialists committed to developing alternative production systems that minimize chemical inputs.



Multiple-Use Borderlands: An Education and Demonstration Project

Proposal

Project Coordinator:

Bruno Moser
Purdue Research Foundation
1165 Horticulture Bldg.
Department of Horticulture
West Lafayette, IN 47907-1165
317-494-1352
317-494-0391 (fax)
Bruno_Moser@hort.purdue.edu

Team Members:

PURDUE:

George Parker,
Forestry and Natural Resources
Kenneth Schuette,
Department of Horticulture
Mike Hickman,
Department of Botany
and Plant Pathology
Cliff Sadof,
Entomology
Glenn Sullivan,
Marketing and Economics
Department of Horticulture
Brian Miller,
Department of Forestry
and Natural Resources
Pete Hill,
T-by-2000 Coordinator
IN Department of Natural Resources
Agronomy Department

FARMERS:

Jeff Lough,
Lough Brothers Farm
Jeff Maddux,
Maddux Farms
Jim Moseley,
Jim Moseley Farms, Inc.
Skif Peterson,
Anthropologist

OTHER:

Steve Bonney,
IN Sustainable Ag Association
Jim Wilkinson,
Western Indiana CRM Club
Ken Collins,
NRCS
Dave Swaim,
Crop Consultant

Funding:

SARE: \$83,832

Duration:

September 1996 - August 1998

The overall purpose of the project proposed is to encourage the use of innovative plantings and designs for borderlands such as filter strips, shelter belts, windbreaks, right-of-ways and roadsides, as well as ditch banks and fence rows. The project is focused on SARE priority areas such as Environmentally Sensitive Areas, Environmentally Sound Practices, Emerging Issues, and Developing Markets for crops from income-producing borderland plantings. A multi-disciplinary group of scientists will interact with farmers and private-sector specialists in a four-phased approach to addressing the issue of borderlands and their potential not only for ecological remediation, but also multiple use and income-producing alternatives.

Phase One will focus on information gathering through the establishment of a researchers round table to identify and prioritize alternatives, a producers round table to identify constraints, concerns, and preferences and finally, a combined workshop to broaden the perspective of both researchers and producers. Experienced facilitators will conduct the round table and workshop discussions resulting in an information base on which the remaining three phases of the project will build.

Phase Two will involve the development of numerous prototype designs of borderlands to combine concepts from the round table discussions and workshops into functional plans. This will involve the skills of landscape architects to illustrate concepts and designs and depict the progressive stages of various maturing multiple-use borderlands. These site-neutral concepts will be utilized in the demonstration phase of the overall project and in final educational materials resulting from this project.

Phase Three will be the installation of eight demonstration sites in diverse areas of Indiana: four at Purdue Regional Research Farms and four at selected farmer locations, which provide the best opportunities to illustrate innovative designs and are accessible to a broad segment of the agricultural community. Demonstration plantings will also provide sites for future evaluation to determine the effectiveness of given designs as well as potential problems.

The fourth and final phase of the project will result in the development of a slide and video presentation to help audiences envision multiple-use borderlands and the development of a decision-guide publication to assist landowners and land-use professionals in determining which combinations are most appropriate for their specific situation. These educational materials will be available for broad distribution within the North Central Region.



On-Farm Research and Demonstration of Ridge Tillage for Sustainable Agriculture

Final Report

Project Coordinator:

Derrick N. Exner
Practical Farmers of Iowa
2104 Agronomy
Iowa State University (ISU)
Ames, IA 50011
515-294-1923
515-294-9985 (fax)
dnexner@iastate.edu

Team Members:

FARMERS:

Dean and Deborah Ekstrand
Harlan and Sharon Grau
Todd and Linda Hartsock
Paul and Karen Mugge
Ron Vos
Chris Goedhart
Mike Vosika
Lowell and Eunice Wilson
Doyle and Sheryl Wilson
Doug Alert and Margaret Smith
Hal and Georgia Bumgarner
Jerry and Jill Carlson
Donald and Sharon Davidson
Ray and Marjorie Stonecypher
Richard and Sharon Thompson
Allen and Jackie Tibbs
John and Rosie Wurpts
Tom and Irene Frantzen
Michael Natvig
Mike and Jamie Reicherts
Lynn and Linda Stock
Dick and Maryjane Svoboda
Ted and Donna Bauer
Bernie Havlovic
Vic and Cindy Madsen
Ronald L. and Maria Rosman
Eddie Broders
Steve and Gloria Leazer
Dave and Lisa Lubben
Mark and Rita Mays
Jeff and Gayle Olson

Funding:

SARE: \$75,867

Duration:

September 1992 - August 1996

Practical Farmers of Iowa (PFI) is a nonprofit, farmer-member organization that works to share information about profitable, environmentally sound farming practices and that encourages both farmers and agricultural scientists to research related questions. PFI has developed a methodology for farmer-managed on-farm trials that has been recognized for its statistical precision and user accessibility. Practical Farmers of Iowa has since its formation in 1985 sought collaboration with ISU researchers and Extension. Two Extension associates now coordinate PFI on-farm trials and education programs.

A number of PFI members use ridge tillage, a system in which crops are grown on permanent ridges. This is a minimum-tillage system in which the soil is not disturbed from harvest to planting. Row crops are customarily cultivated for weed control and to reform the ridges. Ridge tillage has not been as extensively researched as have no-till and conventional forms of tillage for crop production, but enough documentation exists to suggest the potential benefits and problems of ridge tillage. Most lacking has been information on the application of ridge tillage to achieve environmental and efficiency goals. Through this project, PFI farmers both demonstrated and researched ridge tillage in the context of working production systems. They used randomized, replicated field trials to document the effectiveness and economics of alternatives in fertilizer rates and placement, weed management, and cover crops. They also compared ridge-till to other popular tillage systems, and they utilized the basic ridge tillage technology to move into more complex and diversified systems like narrow strip intercropping.

Results showed ridge tillage to be compatible with practices that benefit the environment (e.g., nitrogen rate reductions, banding of fertilizers and herbicides, nonchemical weed management, cover cropping, and narrow strip intercropping). The economics of ridge tillage also compared well to that of other systems. These research/demonstration plots often involved collaboration with university researchers and county Extension personnel. Agricultural scientists found in these trials an opportunity to conduct research at a greater number of sites, sites that closely approximate the "real world," and sites where skilled management contributed to the success of new practices. PFI farmers gained the expertise and laboratory facilities of the researchers. In practice the collaboration has been greater than the sum of these parts, as researchers and farmers together focused on new hypotheses. Likewise, the involvement of local Extension and NRCS personnel added to the "multiplier effect" of these demonstrations. An equally important long-term effect may be the reinforcement of a local consensus for stewardship and sustainable agriculture.



Investigation of the Viability of Growing Herbs as Alternative Crops for Iowa Farmers

Final Report

Project Coordinator:

Eric L. Franzenburg
Benton Development Group
116 East 4th St.
P.O. Box 358
Vinton, IA 52349
319-472-5545
319-472-2914 (fax)

Team Members:

Iowa State University (ISU):
Michael D. Owen
Agronomy

Lester A. Wilson
Food Science

Dan Curry
Seed Science Center

Linda Engleken-Fisher
Benton County Extension Director

FARMERS:

Regis Zweigart
Tim Metz
John Maddick
John Baumhoefener
Brian Bierschenk
Jean Donahue
Dave Gahring
Thomas Davis
Mark Wall
Roger Edmunds
Walt and Pam Pick

OTHER:

Iowa Producers Cooperative

Funding:

SARE: \$50,260

Duration:

October 1994 - September 1996

The development of herb production in Iowa is definitely an option for farmers looking to diversify their farm operations. While there are hindrances to success, if the farmer is willing to go to extra lengths to maintain quality and a high level of management throughout the growing season there are financial rewards. The use of the process budget to evaluate alternative crops and their production practices is an integral part of the development process. Accurate record keeping provided vast amounts of information on profitability of herbs in Iowa. After compilation of two years of information it appears that the herbs showing the greatest promise for reliable profits are basil, cilantro, dill, and parsley. The cultural practices identified as most beneficial for all four crops are use of organic mulches (corn stalk or corn cob) to reduce weed pressure between rows and at the same time conserve moisture, reduce erosion, and maintain clean herbs at harvest. Also the use of 30-inch rows appear to maintain optimum production while reducing disease problems.

Successful weed control in herb crops can be achieved by use of primary tillage periodically before planting to eliminate as many weed seedlings as possible. Also, a clean seedbed by use of tillage immediately before planting will give herb crops a competitive advantage early in the season. Time and labor requirements will prove to be the largest obstacle in the development of large-scale production in the area. While harvesting and processing can be mechanized to a large degree, there are several aspects in both areas that have significant labor needs. Weed control will be the area of greatest need for a reliable work force at crucial times in crop development. The number of labor hours needed to plant, maintain in the field and harvest, and process an acre of herbs can be as high as 240 hours. Effective management of the crop along with mechanization of harvest can drastically reduce this number, however. Equipment needs that would be considered out of the ordinary for Iowa farms would be minimal. Processing could be done in a cooperative manner, eliminating the need for each farmer to have his or her own line.

Two aspects essential for further development include processing quality products on a large scale and maintaining markets. A processing system has been established, providing a quality product with minimal losses. This will be expanded to handle larger quantities of herbs in the future. Investigation of new markets is an ongoing process and will develop with time once quality of the product has been established and circulated to the right buyers. Current markets accepting our products include: Frontier Cooperative Herbs, Norway; Nature's Cathedral, Blairstown; and Ameraherb, Ames. Other potential markets include Tones Spices, Ankeny; and grocery stores such as Hy-Vee.



Production of a Videotape Series Demonstrating Improved Grazing Practices to Promote Forage-Based Livestock Production in the Upper Midwest

Annual Report

Project Coordinator:

James R. Russell
Iowa State University (ISU)
Department of Animal Science
Room 301 Kildee Hall
Ames, IA 50011
515-294-4631
515-294-2401 (fax)
jrusell@iastate.edu

Team Members:

ISU:
James R. Russell
Department of Animal Science

Stephen K. Barnhart
Department of Agronomy

Brian Menz
Extension Communications

Daniel G. Morrical
Department of Animal Science

Kenneth J. Moore
Department of Agronomy

Ann M. Cowen
South Central Iowa CHIPS
Extension Service

Claes Jonasson
Extension Communications

FARMERS:
Steve Hopkins

Jed Becker

Ralph Neill

Mike Hunter

Don Faidley

NRCS:
Robert Dayton

Rick Sprague

Funding:
SARE: \$19,200

Duration:
October 1994 - September 1996

Although incorporation of forages in farming systems results in less soil erosion and water pollution and greater wildlife habitat than row crop production, profitability of forage use must be equal or greater to row crop production in order to increase their use in farming. Considerable research has demonstrated that the profitability of forage-based livestock production systems would be significantly improved by improving management during summer and winter. Best management practices for an individual farm are site-specific so training producers improved grazing management can not be done with single set of steps as readily as row crop production. Producers need a general set of guidelines which they can manage differently depending on the annual variations in environmental and economic factors on their own farm.

Videotapes provide a valuable means of demonstrating improved farming practices. Few videotape series are available in the upper Midwest. Those available emphasized economic and environmental benefits, but few demonstrate technical considerations. The objective was to develop a videotape series demonstrating improved grazing practices applicable to the Upper Midwest. A 5-tape series of videotapes was developed: 1) *Introduction to Managed Grazing* discusses the importance of ruminant livestock, the benefits of incorporating grazing into enterprises and the advantages and disadvantages controlled grazing practices; 2) *Pasture Plants* describes methods of improving pasture productivity by considering effects of grazing intensity on photosynthetic capacity through leaf area and nutrient absorption through root growth and the habit and management of growth in forage species found in Midwest pastures; 3) *Animal Management* describes technical aspects of managing a controlled grazing system including the determination of stocking rates and the size, number, shape and placement of paddocks needed to optimize the profitability. It also discusses placement of watering systems, gates and milking facilities, management of reproduction and internal parasite control to optimize management in controlled grazing systems; 4) *Fencing and Watering Systems* describes options in fencing and watering equipment currently available and considerations to make use of equipment in the establishment of the optimal controlled grazing system; and 5) *Year Around Resource Management* describes productivity and nutritive value of forage resources available for grazing in the different seasons and systems to match the numbers, genetics and management of beef cows, beef stocker steers, dairy cows or ewes with forages available for grazing in each season to optimize profitability.

The videotapes were prepared and copied by October 1995. They have been distributed to each Iowa county extension office and the availability of the series for sale has been announced. To date, 47 sets of the videotape series have been distributed. A written publication and an evaluation form are being prepared as support materials for the videotape series and will be distributed.



An Integrated Riparian Management System to Control Agricultural Pollution and Enhance Wildlife Habitat

Annual Report

Project Coordinator:

Thomas M. Isenhardt
Department of Forestry
Iowa State University (ISU)
251 Bessey Hall
Ames, IA 50011
515-294-8056
515-294-2995 (fax)
isenhardt@iastate.edu

Richard C. Schultz
(same address as above)
515-294-7602
515-294-2995 (fax)
rschultz@iastate.edu

Team Members:

ISU:
Joe P. Colletti
Department of Forestry

Charles Rodrigues
Department of Forestry

William W. Simpkins
Department of Geological
and Atmospheric Sciences

Brent Danielson
Department of Animal Ecology

Carl Mize
Department of Forestry

Michael Thompson
Department of Agronomy

Paul Wray
Department of Forestry

James Pease
Department of Animal Ecology

James W. Raich
Department of Botany

FARMERS:
Ronald Risdal
Lon Strum
Loran D. Tjernagel

Funding:
ACE: \$102,600

Duration:
September 1995 - August 1997

An integrated riparian management system is being established along a central Iowa stream to demonstrate benefits of properly functioning riparian zones in the heavily row-cropped Midwest. The model system consists of: 1) a buffer strip of fast-growing trees (located closest to the stream), shrubs, and native grasses (adjacent to agricultural fields); 2) soil bioengineering for the stabilization of eroding stream banks; 3) constructed wetlands to intercept and process pollutants contained in agricultural tile drainage; and 4) rotational grazing systems to reduce livestock impact in the riparian zone.

This project represents continuation and expansion of previous initiatives and takes advantage of unique opportunities at the research site. The existing Multi-species Riparian Buffer Strip (MRBS) was expanded in 1994 to include another mile of stream length immediately upstream. The landowner/cooperator at this site employs fundamentally different agricultural management practices. This is allowing for the investigation of buffer strip function under radically different conditions. This opportunity is also allowing for replication of constructed wetlands to process agrichemicals contained in tile drainage and of soil bioengineering technologies to stabilize eroding stream banks.

The ability of this integrated riparian system to improve water quality is being quantified through the monitoring of sediment, nitrogen, and atrazine in the surface runoff, shallow and deep groundwater, stream and tile water, and plants and soil in both the MRBS and the wetland. The rate of stream bank collapse of willow planted stream banks is being compared to that of similar, untreated stream banks. The enhancement of wildlife habitat is being assessed through surveys comparing bird and small mammal use of treated riparian areas with degraded riparian areas. Costs and benefits are being derived which allow farmers to evaluate the design, establishment, maintenance, and effectiveness of each individual practice and the integrated system. Technology transfer includes the development of a video and slide set, field days, and a self-guided trail.

This team has been working together since 1990 when the riparian management system was first established. The project is quantifying the ability of an integrated riparian management system to reduce non-point source pollution to surface waters and to enhance wildlife habitat. It is intended to provide to the farmer the design, establishment procedures, and maintenance requirements for the components of the integrated system as well as the costs and benefits. Also, it provides a single site on which all practices of the integrated riparian management system can be demonstrated.



On-Farm Evaluation of *Beauveria bassiana* for Long-Term Suppression of the European Corn Borer in Midwestern Cropping Systems

Proposal

Project Coordinator:

Derrick N. Exner
Practical Farmers of Iowa
2104 Agronomy Hall
Iowa State University (ISU)
Ames, IA 50011
515-294-1923
515-294-9985 (fax)
dnexner@iastate.edu

Team Members:

Leslie C. Lewis
Research Entomologist
Professor
Corn Insects Research Unit
USDA-ARS
Department of Entomology
ISU

John J. Obrycki
Associate Professor
Department of Entomology
ISU

Funding:

ACE: \$30,167

Duration:

September 1995 - August 1996

The European corn borer (ECB), *Ostrinia nubilalis* is a serious pest of corn in the Corn Belt, causing estimated yield losses in the Midwest from \$50 to \$120 per hectare of corn (est. \$20-\$50 per acre). With increasing restrictions on insecticides, the call for sustainable agriculture, and the federal mandate for less surface and ground water remediation, there is a greater need for innovative methods to control this pest.

We propose to use on-farm demonstrations, with cooperators from the Practical Farmers of Iowa (PFI), in a biointensive approach to managing this insect. An entomogenous fungus *Beauveria bassiana*, that develops a unique endophytic relationship between the corn plant and the European corn borer will be employed in this management system. The fungus will be applied to corn at the whorl stage, pollen-shedding stage and at senescence (harvest) to manage the first generation, second generation, and overwintering European corn borer larvae. In small field plots *B. bassiana* has been shown to reduce plant feeding during the growing season and any *B. bassiana* present at harvest kills overwintering larvae, reducing the following year's population. Once this fungus is placed in the ecosystem it will maintain itself in the soil, crop residue, and the growing corn plant. It will colonize plants in subsequent years, eliminating the need for continuous application of the fungus. If this sequence is practiced over a wide area it may be possible to maintain the corn borer below an economic threshold without use of synthetic chemical insecticides.

This approach may completely transform European corn borer management. Primary benefits of this proposed research are: 1) reduced producer dependency and exposure to synthetic insecticides; 2) less environmental contamination; and 3) a contribution to long-range goals of reduced environmental and ecological disruption from over use of insecticides.



Importing a Sustainable Model of Feeder Pig Production from Sweden: A Cooperative Project

Final Report

Project Coordinator:

Mark Honeyman
Research Farms
Iowa State University (ISU)
20 Curtiss Hall
Ames, IA 50011
515-294-4621
515-294-6210 (fax)
honeyman@iastate.edu

Team Members:

FARMERS:

Cecilia and Åke Bergvall
Säffle, Sweden

Nolan and Susan Jungclaus

Marvin and Deb Freiborg

Tom and Irene Frantzen

Dan and Lorna Wilson

OTHER:

Hans Ekdahl
Swedish Farmers
Meat Marketing Association

Marlene Halverson
Independent Consultant
ISU

Larry Jacobson
Extension Service
University of Minnesota (UM)

Ian Greaves
School of Public Health
UM

Diane Halverson
Animal Welfare Institute

Land Stewardship Project

Bo Algers
Swedish University
of Agricultural Sciences (SLU)

Barbro Mattsson
SLU

Funding:
SARE: \$81,513

Duration:
October 1995 - September 1996

The Swedish model has been established on three farms. Another farmer purchased a new farm in 1995 to have room for the Swedish model but is waiting to make further investments in buildings. The Frantzens incorporated some of the practices they saw in Sweden, such as increasing the space per gestating sow in their straw-bedded gestation barn, with favorable results but are not planning to make major changes in their current operation. In addition to site and advisory visits to project farms, the project co-coordinator has visited approximately 12 prospective farms in Minnesota and Iowa and discussed with farmers how the Swedish model could be used on their farms.

The project hosted a 10-day visit by Swedish researchers, farm advisors, and farmers. Individuals presented the Swedish perspective on livestock agriculture, animal welfare, environment, and meat quality at numerous seminars and workshops geared to farmers. These included meetings and seminars in western Minnesota; Iowa State University (with Dennis Keeney, Leopold Center director, faculty in the Department of Animal Science, and a swine genetics station, as well as a field day at ISU's Armstrong Research Farm and an all day Swine Systems Options conference attended by 230 people); St. Paul Bank for Cooperatives; a middle school biology class in Minnesota; a Minnesota church; and the Department of Applied Economics at the University of Minnesota. They also visited the six farms in Minnesota and Iowa.

By Sept. 12, 1996, each of the project farms will have held at least one open house and field day to demonstrate how each farmer has incorporated the Swedish model. Jungclaus have held two open houses (80 and 50 farmers in attendance) and been a site on an "odor" tour conducted by Minnesota's Land Stewardship Project to demonstrate the differences between outdoor air quality effects of deep-straw versus liquid manure systems. The Wilsons held one open house/field day that was attended by about 120 farmers. Armstrong Research Farm will have been the site of two open houses/field days, in February and September 1996. Halverson, Kent, Wilson, and Jungclaus have made presentations, at these open houses and other seminars and workshops.

Each participating farmer received numerous inquiries from the press, from farmers, and extension personnel. The project and the farmers have received significant press coverage. Halverson and Honeyman have drafted a fact sheet on the Swedish system that will be published and widely disseminated this fall by the Leopold Center for Sustainable Agriculture. A video aimed at potential farmer-adopters and assembling footage from several Swedish farms is also in the works. Finally, Halverson and Jungclaus are cooperating with a project of Minnesota Department of Agriculture's Energy and Sustainable Agriculture division to develop producer-oriented educational materials about alternative swine production systems that exist in the state.



FFA Participation in On-Farm Demonstrations of New Tools for Optimizing Use of Animal Manures in Crop Production

Annual Report

Project Coordinator:

Alfred Blackmer
Department of Agronomy
Iowa State University (ISU)
Ames, IA 50011-1010
515-294-7284
515-294-3163 (fax)
ablackmr@iastate.edu

Team Members:

David Briggs
Agricultural Education Instructor
FFA Advisor
Jefferson-Scranton
Community Schools

Eldon Weber
Affiliate Instructor
Conservation Education Coordinator
Department of Agricultural
Education and Studies
ISU

Craig Hertel
Extension Education Coordinator

Glidden-Ralston Community Schools

Carroll Community Schools

Hampton Community Schools

North Tama Community Schools

Funding:
SARE: \$90,000

Duration:
September 1995 - August 1997

Animal manures once were widely regarded as a valuable source of nutrients in crop production systems. Improvements in the manufacture and transport of commercial fertilizers relieved the need for integrating manure management into cropping systems. As commercial fertilizer began to replace animal manures, many farmers began to view animal manures as a waste product rather than a resource. At present manure is commonly applied only to fields directly adjacent to livestock units, and commercial fertilizers are applied to these same fields at rates that suggest little regard for the nutrient value of the manure.

New tools recently have been developed that enable on-farm assessment of the N status of cornfields: the late-spring soil nitrate test and the end-of-season cornstalk test. These tools are simple and inexpensive to use, and offer the farmer an unprecedented opportunity to characterize degrees of excess in N availability. Extensive use of these new tools revealed that a high percentage of Iowa corn producers unknowingly apply much more N than needed. This over-application is most pronounced on fields that receive applications of animal manure. The new tools can increase the value of animal manures by helping farmers identify fields that do not need additional N. The primary barrier to acceptance of these new tools by Iowa farmers is the belief that manure has little value because commercial fertilizers are relatively inexpensive and more reliable. Farmers who manage both crop and livestock production units would benefit most from using these tools, but they are difficult to reach because only a small percentage of their attention is focused on N management. The goal of this project is to reach these farmers through FFA students.

There are five primary FFA chapters involved in the project: Greene County, Carroll, Glidden-Ralston, Hampton-Dumont, and North Tama. Students and advisors from the chapters were involved in identifying field sites, collecting samples, and communicating results to local farmers. Students from these, and an additional six FFA chapters, also collected soil and plant samples for the spring and fall N-CHECK PROGRAM, a pilot project to help corn producers initiate a quality control program on nitrogen management. More than 800 samples have been processed in 1995 and 1996. As a result of this project FFA students have initiated programs in their communities which promote use of the late-spring soil test and end-of-season cornstalk test. Some FFA chapters offer soil nitrate testing to local farmers. Curriculum materials have also been developed to help other interested FFA chapters develop soil and cornstalk testing programs in their communities. This project targets farm families producing crops and livestock. Also, the new tests enable site-specific management that reduces: unnecessary inputs of commercial fertilizers, costs of crop production, and potential for environmental degradation. It also increases competitiveness of agriculture and helps keep dollars in rural communities.



Regional Inventory and Assessment Project (Quality of Life)

Annual Report

Project Coordinator:
Cornelia Butler Flora
North Central Regional Center
for Rural Development
317 East Hall
Iowa State University (ISU)
Ames, IA 50011-1070
515-294-1329
515-294-2303 (fax)
cflora@iastate.edu

Team Members:
Michael Bell
Department of Sociology
ISU

Michael McCall
Department of Sociology
Macalester College

Helene Murray
Minnesota Institute
for Sustainable Agriculture

Funding:
SARE: \$146,204

Duration:
September 1995 - August 1997

The goal of the first year of the project was to develop a series of measurement tools, both qualitative and quantitative, that could be used to monitor quality of life among farmers moving toward a sustainable agriculture and to compare farmers to other groups, including conventional farmers and the population as a whole. Because of the highly subjective nature of quality of life, it was felt necessary to develop contextual quality of life measures aimed specifically at the farm population. An instrument was developed and validated on farmers moving toward sustainability. Those farmers and their spouses completed the new instrument and two general scales. Our preliminary research also suggested that while there were many dimensions in common concerning quality of life among men and women, gender was still an important aspect that would nuance the indicators of quality of life. Thus, particular care was taken in the development of indicators to find indicators that responded to the perceptions of quality of life of both men and women agriculturists.

Working as part of the on-farm monitoring team of the Land Stewardship Project, Helene Murray, Cornelia Flora, and particularly Alison Meares, developed a series of tools to be included in the LSP Monitoring toolkit that: 1) Mapped values of the farm households, each household member individually so that they could share collectively; and 2) An agricultural calendar, where each member of the household delineated seasons according to their own experiences and then shared time demands across the season according to the various tasks in which they were involved during the course of the year. A third tool was developed by Flora and Gregory McIsaac, at the University of Illinois, comparing resource flows on fields that were farmed differently to determine the community level changes that were necessary to maintain or sustain those changes, that at the same time were being monitored in terms of their environmental quality and economic profitability.

Regina Streigel put together a questionnaire based on qualitative work of Cornelia Flora, with the Land Stewardship Project, and preliminary quantitative work with those farmers. She pretested the work and gained important qualitative information that helped improve the survey. The instrument was then validated with a sample of 604 farm people, people from a list drawn from the membership of sustainable farming organizations in the North Central Region. The questionnaire was sent to couples, asking both the man and the woman to respond. The questionnaire was very long, including 60 items on the new sustainable agriculture quality of life questionnaire, with open-ended questions on spirituality, as we felt we knew from our qualitative work this was a very important dimension, and yet we felt our questions were

continued ...



Regional Inventory and Assessment Project (Quality of Life)

continued ...

inadequate to get at it. A traditional quality of life questionnaire consisting of 192 items and the 21-item Beck Depression Inventory were included in the survey instrument.

The median score on the traditional quality of life instrument for the sustainable agriculture sample was 120, which is considered high on this scale. The average score that has been previously validated has been about 113.

We originally hypothesized six dimensions of quality of life, but the data revealed two that were most important. The first dimension related to farm and occupation and included a strong emphasis on learning alternatives and spirituality related to the farm. The second factor was relational, focusing on respect and understanding of those nearest to the respondent. Much to our surprise, items related to money were not part of either quality of life dimension, nor were items related to health.

In the newly developed scale, the most important quality of life indicators were: 1) I enjoy finding new ways of doing my farm-related work; 2) I am proud of the work I do on the farm; 3) The person closest to me and I agree about future goals; 4) I visit people who are using similar farming practices as I am to learn how they do it; 5) I make use of resources available to farmers; 6) Professionals and service people with whom I interact respect me as a farmer; 7) The person I am closest to emotionally respects my feelings; 8) I am involved in decisions about how my farm is run; 9) People I am close to help me work toward my personal goals; 10) My ideas are listened to in family discussions; 11) I have many options in the I do my farm work; 12) I feel appreciated by people I am close to for what I contribute to the farm; 13) I feel competent to deal with life's difficulties; and 14) My spouse/partner wants things to be his/her way or no way.

Our next analysis will be to refine the scales of sustainable quality of life for farmers with the other indicators of quality of life and to do separate analyses by sex of the respondent. We will also do qualitative analysis of the information gathered on spirituality so that we can strengthen that dimension in the quantitative measure. We will refine the questions to five major quality of life for farmer indicators and ask colleagues who can document farmer surveys to include these items in their next surveys so we can have some comparisons among a wider range of farmer groups. We will continue to refine the qualitative measures that will look at quality of life, at both the community and household level.



The Adams County CRP Research and Demonstration Project

Proposal

Project Coordinators:

Bill Riley and Brian Peterson
Southern Iowa Forage
and Livestock Committee
2243 Loomis Ave., Suite 2
Corning, IA 50841
515-322-3226
515-322-3593 (fax)

Team Members:

Rural Economic
and Community Development

Farm Service Agency

Mark Boswell
Farmer and Chair
Southern Iowa Forage
and Livestock Committee

Iowa State University (ISU):
Chris Nelson
Extension

Stephen Barnhart
Forage Specialist
Extension

Russ Bredahl
Beef and Forage Specialist
Extension

Daryl Strohbehn
Animal Science Department

NRCS:
Barbara Stewart
State Agronomist

Rick Sprague
CRP Project Manager

FARMERS:
Lee Faris

James Hoffman

Norvell Houck

Juanita Cooley
Landowner

Funding:
SARE: \$50,000

Duration:
September 1996 - August 1998

The Southern Iowa Forage and Livestock Committee (SIFLC) was established in 1990 as a cooperative effort between farmers, local business people, the NRCS, Iowa State University Extension, Rural Economic and Community Development (RECD), and Farm Services Agency (FSA). It was developed from a concern as to what will happen to the land currently enrolled in CRP at the end of the contract period. The Adams County CRP Research and Demonstration Project was the first in the nation to receive approval to demonstrate alternatives to row crop production on highly erodible marginal land. SIFLC's mission statement is to demonstrate an economically feasible and environmentally sound alternative to row crop production on highly erodible marginal land. As the project has evolved SIFLC encouraged an alternative land use to intensive row crop production on highly erodible marginal land regardless of whether current land use is CRP.

The project demonstrates management intensive grazing using beef cattle as an alternative to row crop production. We will assist SIFLC in the operation of the project and facilitate the transfer of information from the project to producers. The project consists of a farm currently enrolled in CRP with predominantly glacial till and paleosol soils on 9-14 percent slopes. Three grazing systems are established on the farm, using a contour lane system to move cattle and reduce erosion in lanes, high powered "New Zealand" style electric fence, and several watering systems. The farm demonstrates concepts that producers can use to implement intensive grazing systems.

An important feature of this proposal is the transfer of information. The "audience" includes producers that can implement the concepts on their farm, lenders, veterinarians, and USDA agency people that work with producers to implement management intensive grazing systems. The transfer of information will be accomplished through grazing clinics, winter workshops, annual reports, field days, and providing material to vocational agriculture instructors. Funds from this proposal will assist SIFLC in employing staff to implement demonstrations at the farm and a secretary to the board that will help coordinate activities and be active in the networking process. A project coordinator is provided with funds from NRCS. The Leopold Center and ISU Extension Service provide funds for personnel that help implement project activities.

This proposal promotes weed control that will reduce pesticide use and maintain legumes in a grazing system. It promotes a sustainable forage system that reduces soil, nutrient, and pesticide loss from highly erodible marginal soils with a less expensive method than on row crop land. The project involves extensive networking using reports, seminars, workshops, and assisting educational institutions with developing or improving sustainable ag curriculum.



Assessing the Potential for Biological Control of Field Bindweed *Convolvulus arvensis* with the Gall Mite *Aceria malherbe* and the Moth *Tyta luctuosa*

Final Report
Project Coordinator:
James R. Nechols
Kansas State University (KSU)
Department of Entomology
Manhattan, KS 66506
913-532-4744
913-532-6232 (fax)
jnechols@oz.oznet.ksu.edu

Team Members:
KSU:
James R. Nechols
Department of Entomology

Michael J. Horak
Department of Agronomy

Ralph E. Charlton
Department of Entomology

William Noble
Department of Statistics

Dave Regehr
Department of Agronomy

FARMERS:
Roger Hoffman
Morris and Jack Burwell
Cliff Roeser

OTHER:
Dennis Peterson
Riley County Weed Supervisor

Jerry Jost
Kansas Rural Center

William Scott
State Weed Specialist
Kansas State Board of Agriculture

Riley Walters
Butler County Weed Supervisor

Norm Oedding

John Barbur
Division of Natural Resources

Roy Patton
Harvey County Special Projects

Funding:
ACE: \$75,185

Duration:
July 1993 - August 1996

The bindweed moth *Tyta luctuosa* was shown to successfully overwinter in Kansas for two consecutive years. However, survival varied considerably among and within locations in Kansas. In 1994-95, the average rate of survival, from the overwintering cocoon stage to fully emerged adult moths capable of flight, ranged from 0 to 23 percent. These findings were similar to those obtained in 1993-94 (range of survival: 0 to 20 percent). The highest survival in a single cage was 64 percent. Moth survival was no higher at southern sites than at northern ones, suggesting that this bindweed enemy may be adapted to cold climates.

Very few moths were recovered in a large-scale field experiment designed to assess dispersal. Therefore, we began studies to identify the volatile chemicals produced by female moths that are used as sex attractants. Our rationale was that a species-specific sex attractant would be a useful tool for monitoring dispersal. Two major compounds were identified which elicit a response from males. A field experiment revealed that moderately high densities (about 75/m²) of large *T. luctuosa* caterpillars are necessary for complete defoliation of bindweed in the field. A greenhouse experiment showed that younger (smaller) bindweed plants not only are defoliated by fewer caterpillars, but that the rate of root growth and refoliation is slower when younger plants are damaged. Also, the greater the defoliation of any aged plant, the slower the recovery.

Through presentations, publications, tours, radio shows, press releases, and individual on-farm training sessions, we educated large numbers of farmers, county weed personnel, and the general public about our biological control research efforts for field bindweed. These activities have increased awareness of nonpesticide alternatives for managing weeds, and the potential of using natural enemies to control field bindweed, an extremely serious pest in the Midwest and throughout the United States. Dissemination of our project goals and research findings also has led to cooperation from local farmers.



Development of a Rancher Cooperative to Market Grass-Fed Meat

Annual Report

Project Coordinator:

Dan Nagengast
Kansas Rural Center
P.O. Box 133
Whiting, KS 66552
913-873-3431
913-873-3432 (fax)

Team Members:

Tallgrass Prairie Producer Coop

Members/Ranchers:

Calvin and Shelly Carlso
Gary and Linda Doornbos
Jerry and Mary Dusenbury
Pete Ferrell
Jim and Cathy Hoy
Bruce and Cheryl Spare
Arlan Stackley
John and Anne Wilson

OTHER:

Carl and Emily Shewmaker,
Advisors
Earl B. Wright,
Operations Manager
and Marketing Coordinator
Monica J. Young,
Production Consultant
Jerry Jost,
Heartland Network
Dan Nagengast,
Kansas Rural Center
Dale Kirkham,
NRCS

Small Business Development Centers
Emporia State University
Kansas University
Kansas Farmers Union

Kansas State University (KSU):

Elizabeth Boyle,
Extension Meats Specialist
Melvin C. Hunt,
Meat Scientist
Edgar Chambers,
Sensory Analysis

David Barton,
Cooperative Development Center
Kansas Value-Added Center

Funding:

SARE: \$33,300

Duration:

September 1995 - August 1997

We are well on the way to development of a successful rancher marketing cooperative, now selling grass-fed beef to a local hospital, restaurants, small groceries and individuals. We have completed the difficult process of establishing a legal structure (having to completely redo our initial setup) and are currently involved in the complex process of developing a budget and business plan. We have completed a great deal of market research which has been very encouraging. We are also encouraged in our production research, finding that it is quite possible to produce high quality, lean, tender beef on various forages, and that many people actually prefer the taste of such beef. We are working with our processor on lowering our processing costs, and development of value-added products such as sausage.

We had to fully reorganize our cooperative this summer after realizing that our initial organizational structure did not meet our capital and other needs. We amended our Articles of Incorporation, adopted completely new bylaws, signed new membership agreements and producer agreements (marketing contracts), and sold marketing rights (shares of common stock) to all members. We now feel we are well capitalized and have adequate cash flow for our anticipated operations for the next year. We have developed some unique provisions in our bylaws, such as requiring that members be "family ranchers," allowing co-directorship between spouses to encourage both to be involved, and having actual participation requirements to insure that all members stay actively involved and "carry their own load."

We have completed our literature review of grass-fed beef production, and developed production models for year-round forage-based beef production designed to maximize meat tenderness. We have developed quality control requirements for genetic makeup, slaughter weight, etc. We developed an internal quality control taste testing system for flavor and tenderness control on each carcass. We are investigating mechanical testing for tenderness. We are developing a database for tracking our production. We have decided not to use the conventional USDA grading standards as they put a premium on fat, which we are trying to minimize.

After experiencing a severe fall-winter-spring drought, we have realized our vulnerability to weather extremes in reducing availability of cool season and winter annual forages on which we depend, slowing and increasing cost of production. These are risks of our production model. In direct marketing, customers expect supply regardless of the weather, so we have developed alternatives, and also use our geographical diversity to balance production (some ranches received rains when others didn't – cooperatively, we can strive to meet commitments).

continued ...



Development of a Rancher Cooperative to Market Grass-Fed Meat

continued ...

We completed our sensory lab analysis of our product, which was favored over conventional beef in evaluations by 75 independent panelists for flavor, juiciness, texture, tenderness and overall liking. We conducted a second focus group in Lawrence with help from the Small Business Development Center there. Also, we have done additional small surveys at promotional events, and utilized product evaluation forms returned by our customers. We have gathered testimonials collected from customers that we use in our advertising. We have found strong consumer support for the idea of lean, naturally raised beef, but the primary consumer consideration is tenderness. We are addressing this concern through production techniques, education on cooking methods and again, possibly may invest in a mechanical tenderness testing machine.

We have continued to explore processing options, and had a special meeting with another processor (an intermediate size plant) but remain with our original smaller scale processor who we still feel has the best services for us. We have been working with him to develop a complicated program to insure the integrity of our new label's special claims through segregation of our beef at his plant. This has been very difficult and time-consuming. We hope this will be approved soon. Also we are working on a value-added product (sausage) with our processor, including all the labeling intricacies involved with that. Our primary goal in working with our processor is how to cut costs. We find that the smaller scale processing with its low volume is so much more expensive that it is very difficult for our prices to be competitive with conventional beef. This is one of our biggest problems. Due to the concentration and large volume in the four big packers (who control 84 percent of the beef market), smaller companies are faced with David and Goliath odds. We wish the Justice Department would enforce the Packers and Stockyards Act to limit monopolies in the packing industry.

Our business plan has not yet assumed a unified conventional form, but we are working intensively on developing its components, including capitalization, budget, cash flow, product concept, knowing our competition, marketing plan, etc.



Farmer-to-Farmer Cover Crop Network Complementing On-Farm and On-Station Trials

Annual Report

Project Coordinator:

Jerry Jost
Kansas Rural Center
Heartland Network
2002 E. 1600 Road
Lawrence, KS 66044
913-841-7044 (phone and fax)
jjost@idir.net

Team Members:

Kansas State University (KSU):
Bill Heer

Research Agronomist
South Central Experiment Station

Mark Claassen
Research Agronomist
Harvey County Experiment Station

Stan Freyenberger
Agricultural Economist

Rhonda Janke
Extension Cropping
Systems Specialist

David Norman
Agricultural Economist

Hans Kok
Extension Conservation Specialist

OTHER:
Lisa French
Farmer
Organizer
Resourceful Farmers

Russ Toevs
Farmer
Organizer
Covered Acres Cluster

Funding:
SARE: \$46,954

Duration:
October 1995 - September 1997

Objectives: A network of farmers will share ideas, practical experiences and research information on cover crop rotations; A collaborative process will build research partnerships between farmers and researchers on the assessment of soil quality, crop productivity, soil water use, and economic profit with cover crops in a wheat/grain sorghum rotation; and An evaluative process will serve as a feedback loop into continuing development of the partnership between farmers and researchers.

Thirteen farmers conducted cover crop trials using narrow, farm-scale plots. The trials have two field treatments: rotation with a winter legume cover and rotation without a legume using "best management inputs." The field-size trials avoid field irregularities to the best extent possible. Farmers collect data on rainfall, dates and rates of field operations, labor and machinery requirements, production costs and crop yields. Farmers choose the best opportunity dates for cover crop planting. An optimal target termination date was chosen for all the cluster farm trials. Data on soil water, soil fertility, cover crop growth, and nitrogen tissue tests were collected. Cover crop biomass samples were randomly selected, weighed and dried. Farm data collection was uniformly conducted that includes both agronomic and economic analysis.

The KSU Hutchinson Station researched Austrian winter peas and the KSU Hesston Station investigated hairy vetch in a wheat/winter annual cover crop/grain sorghum rotation. Check plots without a cover crop were used for comparison. Evaluation of cover stands were made prior to winter dormancy the following spring. Dry matter yields and nitrogen content were determined prior to legume termination. Cover crop termination dates were significantly delayed by weather. Grain sorghum was planted in June. Soil profile water was measured gravimetrically or by neutron probe throughout the trial. Soil fertility of each plot was characterized in terms of nitrogen, pH, organic matter, available phosphorus and exchangeable potassium. Soil profile nitrogen at a depth of 0-3' was analyzed. Four nitrogen rates were applied to determine legume nitrogen credit equivalents. Nitrogen utilization by grain sorghum was assessed by analysis of whole plants at sixth-leaf stage, flag leaves at late boot/early heading, and whole plants at maturity. Sorghum yields and grain quality were recorded. A randomized complete block design was used with a factorial combination of treatment variables. Treatments were replicated four times.

Cooperating farmers met on station with researchers and researchers met with farmers to observe on-farm trials. Participants shared observations and data. Both clusters met with a collaborating researcher during two meetings to discuss project progress. Farmers and researchers will conduct final review and interpretation of the first year trial results on Feb. 27, 1997. The project evaluator participated in three of the meetings as a part of evaluation.



Bioremediation of Saline Seeps

Proposal

Project Coordinator:
 Kyle Mankin
 Kansas State University (KSU)
 2 Fairchild
 Manhattan, KS 66506-1103
 913-532-5580
 913-532-5825 (fax)
 kmankin@ksuvm.ksu.edu

Team Members:
 Mark Schrock
 Professor
 Biological and Ag Engineering
 KSU

Gerard Kluitenberg
 Associate Professor
 Agronomy
 KSU

Cooperative Extension Service

Natural Resources
 Conservation Service

Funding:
 SARE: \$17,778
 ACE: \$60,000

Duration:
 September 1996 - August 1998

Saline seeps are an increasing concern in dryland crop production areas of Kansas. Seeps, which range in size from a few square meters to 20 hectares, are growing in number, area, and severity. Due to their distributed nature, seeps often receive full inputs of tillage, fertilizer, and seed, even though no crop is produced. The seep areas are subject to serious wind and water erosion due to the total absence of vegetation under current management. Approximately 65,000 hectares of south central Kansas soils are mapped as saline/sodic, a number believed to be conservative because it is based on soil mapping work performed 30 years ago.

Objectives: 1) demonstrate the use of intensive agronomic practices to use subsurface water while it is still a relatively non-saline resource in the seep recharge area; 2) determine crops and management practices that can sustainably control seeps; 3) educate farmers about the causes and potential solutions; and 4) demonstrate an inexpensive method for mapping salinity and flow patterns around seep areas. Experience from other researchers and farmers will be adapted to south central Kansas. Seep development is related to the shift from native grass prairie to annually cropped winter wheat, reducing net plant water use and resulting in increased water movement downward. As the percolating water encounters a less permeable layer, lateral movement occurs until an outcrop area is reached, where water evaporates and leaves behind various salts accumulated. Seeps typically go unnoticed until salt concentration influences crop production. It is proposed to replace traditional wheat/fallow cropping practice in areas up-gradient from seeps with higher water-use, crops and practices: 1) deep-rooted perennial crops such as alfalfa; 2) flexible cropping systems with minimum fallow periods; and/or 3) plantations of high-value trees. The cropping strategy used to increased water use will be jointly selected and designed with the farmer.

The sites will be instrumented only to the extent necessary to diagnose causes of seeps and to confirm the effects of the treatments. A simple and inexpensive method will be tested to map surface and subsurface boundaries of seep areas as well as underground flow patterns. Extracted soil cores will be used to estimate saturated hydraulic conductivity, salinity, texture, and available water content, and to identify impermeable layer(s) which control seep recharge. Piezometers will help monitor groundwater conditions associated with the seep. Soil and hydraulic properties will be entered into a geographic information system. KSU faculty will design and implement seep remediation strategies. County Extension, NRCS and other local agency personnel will identify two to three demonstration sites and a control site in the seep-sensitive region. Extension will also help develop publications and educational field days. NRCS personnel will supply equipment and services for soil and water sampling. The economic impact of each of seep control method will be examined.



Farmer Marketing Information Coops

Proposal

Project Coordinator:

Jerry Jost
Kansas Rural Center
Heartland Network
2002 E. 1600 Road
Lawrence, KS 66044
913-841-7044 (phone and fax)
jjost@idir.net

Team Members: Kansas Rural Center

PRODUCERS: Russ Groves

Ed Reznicek

Laura Fortmeyer

David Schafer

Funding: SARE: \$22,390

Duration: September 1996 - August 1998

The central objective is to organize farmer information coops for development of farm-to-town markets. In order to balance ecological farming practices with farm profitability, farmers need alternative markets that help them take back the economic middle in agriculture. Four information coops will be organized around marketing of pastured chickens, grass-fed beef, organic grains and frozen lamb. This project advances farmer knowledge in the marketing of locally grown, farm-fresh products. These farmer information coops will be designed to overcome barriers of ignorance about consumer relations, regulations, accounting, production and processing quality control. Reaching out to other farmers who have tested and developed alternative marketing options will help build bridges over these barriers. Teleconference calls are chosen over electronic mail because most farmers don't yet have access to the Internet. Similar teleconference calls have already been used successfully within the Heartland Network, a network of a dozen farmer and rancher clusters working to advance sustainable land practices and an alternative food system.

Each information coop is budgeted for a total of nine hours of calls and eight line connections that will be held six times over two years. Participating farmers will be encouraged to gather together in homes and share a conference call line to bring long distance learning to the local community. These local group study circles participating in this long distance learning will encourage shared learning and cooperation.

These coops improve marketing effectiveness through mentor/apprentice relationships. Opportunities will be provided for farmers to learn first hand from the experiences of others by visiting them. They will see the potential for developing new market niches that generate more economic opportunity. This co-learning will further develop marketing skills and savvy. These relationships will also provide emotional support through the difficult task of developing a loyal customer base. Each coop will have \$1,000 available to them to use as travel money for on-site learning. Any participant in these coops can apply for this travel money to visit a mentor farm, host a visit from a mentor farmer, or make an information gathering site visit. These face-to-face interactions will facilitate extended learning and opportunities for building personal learning relationships that will extend beyond the life of this project. Direct marketing management bulletins will be developed to transfer the learning from these information on coops to the broader public. This will be useful to help still other farmers think about developing their own local market niche. A farmer in each information coop will be contracted to coordinate and facilitate the calls and write the farm-to-town market bulletin.



Integrated System for Sustainability of High-Value Field Crops

Final Report

Project Coordinator:

James P. LeCureux
Michigan State University (MSU)
Extension - Huron County
1460 South Van Dyke
Bad Axe, MI 48413
517-269-6099
517-269-8421 (fax)
lecureux@msue.msu.edu

Team Members:

MSU:

Richard Harwood
Crop and Soil Sciences

Karen Renner
Crop and Soil Sciences

Pat Hart
Botany and Plant Pathology

Maurice Vitosh
Crop and Soil Sciences

Tim Harrigan
Agriculture Engineering

Rick Ward
Crop and Soil Sciences

OTHER:
Ross Voelker
Landowner

Mike Shaw
Farmer

Approximately 85 Other Farmers

Approximately 80 Private
and Nonprofit Groups/Companies

Funding:
SARE: \$73,000

Duration:
October 1994 - September 1996

The Innovative Farmers of Huron County (IF) were organized in early 1994 to develop alternative cropping systems that reduce erosion, improve soil quality, and reduce investment while maintaining a family farm's income. Initially there were 47 members, and the membership has grown to 81 in 1996. Some members are from nearby counties, and three other IF groups have been formed following the Huron County model. Members are divided into eight groups to plan, design and evaluate tillage systems (fall plow, fall chisel, trans-till and zone-till) being used to produce a corn/dry bean/sugar beet rotation. Two 40-acre parcels have been rented by the IF group where randomized and replicated half-acre plots are being used to develop these systems. Yields generated in 1994 exhibited a large gap between traditional fall plow and chisel and the trans-till and zone-till systems. The members at the winter meetings became more aggressive, brushed aside some of the existing myths, and have created systems that are highly competitive in 1995 and 1996. Because of the adjustments made in the systems, the yield gap has been closed with the two strip-tills out-yielding the traditional systems in some cases.

During the past two years, the IF group met several times with guest speakers including Ray Rawson, Rawson Zone-Till System developer; John Anibel, a Michigan farmer involved in site-specific agriculture; and farmers from Scandinavia. The World Wildlife Fund sponsored the group from Scandinavia. A representative of the IF group was invited to participate in a press conference on Capitol Hill that dealt with the release of a report on the "State of Nation's Coast" by the Coast Alliance. In addition, the annual Innovative Farmers tours have resulted in over 200 farmers, government agency and environmental group representatives visiting the IF plots in each of the last two years. The group has been featured in a number publications.

Changes are starting to occur on individual farms, with this program providing the impetus. The Innovative Farmers project is also unique in that 52 agribusinesses, commodity groups, government agencies and lending institutions have provided equipment, supplies and financial support. Members are taking ideas generated at the IF sites and utilizing them on-farm. Members are building their own zone-till planters, planting crops in twin 7-inch rows and interseeding between rows, starting to use zone-till equipment on their own farms and adapting zone-till to narrow row (22-inch) production. A rural sociologist identified 16 reasons farmers can't or won't adopt conservation tillage, and the Innovative Farmers project is geared to address those issues.



Reduced Tillage and Fungicide Input for Enhanced Sustainability in Fresh Market Tomato Production

Final Report

Project Coordinator:

Mary K. Hausbeck
140 Plant Biology Lab
Michigan State University (MSU)
E. Lansing, MI 48824
517-355-4534
517-353-1926 (fax)
hausbec1@pilot.msu.edu

Team Member:

Jack Kelly
Department of Horticulture
MSU

Funding:

ACE: \$30,853

Duration:

July 1995 - September 1996

Currently, fungicides play an important role in fresh market tomato production and are applied on nearly 100 percent of the tomato hectarage in the north central production region. Most growers initiate fungicide sprays when fruit first set and apply subsequent sprays every 7-14 days even if there is no disease risk, resulting in up to 12 or more applications each season. Recent concerns about fungicide residues on food have affected Mid-western tomato production significantly, which has received attention because of heavy fungicidal use in disease control programs in this region.

A disease forecasting system that reduces fungicide use without increasing disease-related losses has been implemented successfully in the Midwest and Ontario for processing tomatoes. However, this forecasting system has not been evaluated for its applicability for fresh market tomato production in the Midwest. Fresh market tomatoes are thin-skinned compared to processing tomatoes and are therefore more susceptible to fruit rots. Also, fresh market tomatoes are picked in multiple harvests and graded for blemishes, whereas processing fruit are harvested once by machine and not graded on appearance.

In this study, fungicide sprays were reduced substantially (a minimum of 36 percent) by making applications according to a disease forecasting system (TOM-CAST) with fungicide sprays triggered by cumulative disease severity values of 13 to 18. Fungicide sprays applied according to the disease forecaster provided control comparable to that obtained with a calendarized conventional spray program. Depending on the fungicide used, \$56 to \$150 per acre savings were realized with use of this forecasting system. Zone tillage allowed persistence of surface rye residue to limit soil and wind erosion and wind-whipping damage to plants. Conservation tillage, use of cover crops and reduced fungicide inputs have considerable benefit for soil health, soil quality, environmental quality, and overall long-term sustainability of field productivity and profitability.



Michigan 1995 Late Blight Education and Management Plan

Final Report

Project Coordinator:

Ben Kudwa
Executive Director
Michigan Potato
Industry Commission (MPIC)
13109 Schavey Road, Suite 7
DeWitt, MI 48820
517-669-8377
517-669-1121 (fax)

Team Members:

MPIC Late Blight
Guidance Committee

Ray Hammerschmidt
Michigan State University (MSU)
Botany and Plant
Pathology Department

MSU Ag Experiment Station

MSU Extension

William Wright Kirk
Environmental and Crop Physiology
Department of Physiology
and Crop Production
Scottish Crop Research Institute
MSU Visiting Assistant Professor

Funding:

ACE: \$25,000

Duration:

July 1995 - August 1996

This grant has made a positive contribution to controlling potato late blight in Michigan as well as contributing to the world wide pool of information on potato blight control. The goal of this program was to reduce fungicide use and control disease. Using the data from the Michigan Potato Industry's 1995 pest survey, the majority of Michigan growers indicated they used 9-15 applications of fungicide to control potato late blight (1995 Pest Survey p-21). Control costs were approximately \$92 per acre.

The spread of potato late blight disease is directly related to the presence of inoculum and weather conditions. This project specifically addressed reduced pesticide use. It was necessary to recommend to growers that they adhere closely to fungicide recommendations during the 1996 growing season in order to stop the spread of disease (W.W. Kirk, Late Blight Control Guide), which was known to exist in many Michigan locations.

U.S. potato growers are facing a steep learning curve with regard to understanding the life cycle of the disease and control measures. Debate ranges from the importance of disease-free seed to treating fields infected with disease, and preventing the disease from infecting the crop. This project funded the salary, fringe benefits, travel, and supplies for a visiting assistant professor position within the Botany and Plant Pathology Department of Michigan State University. William W. Kirk was hired with a 50 percent extension and 50 percent research appointment with funds provided by the Michigan Potato Industry. This grant provided some of the funding necessary to pay salary, fringe benefits, and travel. All of the objectives of the grant were attempted, however, results may not be evident for several years.

Due to the nature of the disease and currently registered fungicides, it is necessary to be on a protective spray program. Reducing pesticide use may not be immediately possible, however, with increased management education and a minimum-use program is in place. The cost of control (\$92 per acre, 1995 Pest Survey) and expected cost of control of \$150 per acre for the 1996 crop will encourage a minimum-use program.

Identifying disease is a one on one educational process. When Kirk showed two growers diseased tissue from potatoes grown at the MSU Muck Research Farm. In this particular situation the growers indicated they had never seen potato late blight. Scouting fields requires highly trained people. Training occurred at meetings, seminars, and field days. The meetings are held at several locations across the state.

continued ...



Michigan 1995 Late Blight Education and Management Plan

continued ...

Growers were encouraged to contact Kirk to determine when to destroy a part of the crop. During the 1996 season, several small portions of late blight infected fields were eradicated.

Monitoring resistant to metalaxyl is becoming less important since almost all new late blight finds are A-2 strain or metalaxyl resistant. Continued testing will go on at the MSU late blight lab, however, all recommendations are based on A-2 US 8 strain, being the population growers must control.

Since resistant populations are most prevalent and control products are geared to resistant populations, all emphasis and recommendations are for resistant populations.

Emphasis at meetings, seminars, and field days during the period of this grant has been placed on management, including properly disposing of cull piles, killing of volunteer potatoes, planting non infected seed, early protective sprays, use of sec. 18 fungicides, complete spray coverage of crop, eradication of areas showing greater than 20 percent infection, vine desiccation, and clean harvest.

The spread of potato late blight is a community problem, which includes home gardeners, weed plants and tomato plants. The spread of the disease was discussed at meetings, seminars, and field days throughout the year. A Late Blight Control Guide (W.W. Kirk April 1996) published for the purpose of educating growers outlines the spread of disease.

Growers have been made aware of the transmission of disease by infected seed. In February 1996 a special seminar was held at the 1996 Michigan Winter Potato Conference to discuss seed and its role in infecting a crop. Kirk has been invited to be the guest speaker at the December 1996 National Potato Council Seed Seminar to discuss late blight and seed issues. A follow-up seminar will be held at the 1997 Michigan Winter Potato Conference.

The Michigan Potato Industry will continue with the extension and research activities established by this grant for at least the next two years. The MPIC will continue its annual Pest Survey, including requesting information from growers on late blight and reporting information to EPA. Small plot fungicide trials and field trials will continue. Potato late blight will be a topic for discussion at various events.



Domestic Birds as Weed and Insect Pest Biocontrol Agents: Field Experimentation and On-Farm Evaluation

Annual Report

Project Coordinator:

Laura B. DeLind
Department of Anthropology
Michigan State University (MSU)
East Lansing, MI 48824
517-355-7490
517-432-2363 (fax)
laura.delind@ssc.msu.edu

Team Members:

Stuart Gage
Professor
Department of Entomology
MSU

Lisa Bohannon
Research Assistant
Department of Sociology
MSU

M. Sean Clark
Research Manager
Sustainable Agriculture Farming
Systems Project
Department of Agronomy
and Range Science
University of California-Davis

FARMERS:
Tom Summers

Bruce Schultz and Steve Richards

Markus Held

Eleanor and Bob Glick

Jane Bush

Shelly and Quinn Cumberworth

Funding:
SARE: \$25,200

Duration:
September 1995 - August 1997

This two-part study: 1) evaluates the agricultural and ecological potential of using free-range chickens and geese as biological control agents for insects and weeds; and 2) examines, through a set of six case studies, how free-range birds are actually being used in on-farm settings. Particular attention is paid to the qualitative as well as quantitative factors that enhance or constrain the integration of domestic birds into small-scale farming systems.

Study findings indicate that domestic birds, geese in particular, have potential for biological pest management. Geese show the greatest potential in diversified horticultural operations, especially when agrochemicals, such as herbicides, are not used. Production systems comprised of perennial shrubs and trees are most compatible as they provide shade for the birds and are relatively immune to feeding and trampling damage. While chickens were found to consume insects and weeds, their impact did not result in any real detectable crop protection benefits, with the possible exception of their potential as predators of Japanese beetles. Achieving any measurable level of insect or weed control with free-range chickens would require much higher stocking rates than were used in this study.

Study findings also suggest that the ideal use of domestic birds as biological control agents as determined through scientifically controlled experiments differs from their real use on working farms. Farmer collaborators utilize birds and evaluate their effectiveness on the basis of localized needs and internalized values that may themselves be inconsistent and that only partially reflect rational production concerns. Differing interpretations of agricultural sustainability help to explain differences in bird use. Likewise, the age of the farming household, the organizational stability of the farming operation, local agricultural networks and community infrastructure all have a bearing on bird adoption and use. The study describes the ecological, social and ideological context within which bird-use decisions are made on six small Michigan farms. Interpretive data were gathered through on-farm participant observation, a value survey and farmer-framed photographs.

Study findings have been published in professional journals and presented at agricultural conferences and will be made available on a web page affiliated with Michigan State University's sustainable agriculture homepage.



Ecological Principles of Habitat Management for Weed and Insect Biological Control

Annual Report

Project Coordinators:

Douglas A. Landis
Michigan State University (MSU)
104B Pesticide Research Center
East Lansing, MI 48824
517-353-1829
517-353-5598 (fax)

Karen A. Renner
Department of Crop and Soil Sciences
MSU
East Lansing, MI 48824
517-353-9429
517-353-5174 (fax)

Paul C. Marino
Department of Biology
College of Charleston
Charleston, SC 29424
803-953-7638
803-953-5453 (fax)

Team Members:

FARMERS:
Robert and JoAnn Fogg
Fogg Organic Farms

John Diehl
Diehl Fields

Sid Hawkins Jr.

Lavern Eldred

Dale Swiler

Garry Pruden

David Dankenbring

Laurence Woodworth

Jack Caughey

William Garvey

OTHER:
Fabián D. Menalled
MSU

Funding:
SARE: \$94,923

Duration:
September 1995 - August 1997

The use of natural enemies such as seed predators and parasitoids represent an alternative to control weed and insect pests in agro-ecosystems. In this annual report are the results obtained during the 1996 growing season when we analyzed the influence of within-field and landscape variables on the abundance and diversity of natural enemies. We also report our plans for the 1997 growing season of applying the knowledge obtained from previous studies into a series of whole-farm experiments.

Ground beetles (*Coleoptera: Carabidae*) are well known as natural enemies of both weed seeds and insect pests. Thus, on a corn/soybean/small grain field located on Michigan State Campus we examined the influence of refuge habitats and cover crops in the conservation of ground beetles between May and November 1996. We related these observations with weed seed and fly pupae predation rates. We observed 12 species of ground beetles, the majority of which feed on insect pests. *Harpalus pensylvanicus*, a ground beetle that feeds on weed seed, showed a peak of abundance during August. Concurrently, the maximum predation rate in three weed species was observed during August. This within-field study demonstrated that farming practices influencing beetles abundance may modify the rate of success of weed biological control programs.

The second set of activities during the 1996 growing season was aimed at analysis of influence of landscape complexity on true armyworm and weed seed biological control. Specifically, we tested the hypothesis that pest damage in fields located within structurally complex landscapes is higher than in fields located in simple landscapes. We conducted experiments in 18 corn fields distributed in three areas across southern Michigan. In Leslie we observed higher parasitism for armyworm in the complex landscape than in the simple one. We did not observe any clear tendencies in the other two areas. Thus, we can not conclude that higher parasitism in complex landscapes is a rule of agro-ecosystems. We present alternative hypotheses to explain observed results. Our preliminary results indicated a remarkable high seed removal rate with higher seed predation in fields located in a complex landscape.

We expect to integrate knowledge obtained at these two levels of analysis with several whole-farm experiments we will perform during the 1997 growing season. Our goal is to understand interactions among processes occurring at these three levels of analysis: within-field, whole-farm, and landscape level. This knowledge will allow us to propose alternatives to enhance probability of success of techniques to control pests which are based on biological processes.



Annual Medics: New Legumes for Sustainable Farming Systems in the Midwest

Final Report

Project Coordinator:

Craig Sheaffer
Department of Agronomy
and Plant Genetics
University of Minnesota
411 Borlaug Hall
1991 Buford Circle
St. Paul, MN 55108
612-625-7224
612-625-1268 (fax)

Team Members:

John Hall
Farming Systems Agronomist
Michael Fields Agricultural Institute

Mary Hanks
Energy and Sustainable
Agriculture Program
Minnesota Department of Agriculture

Oran B. Hesterman
Crop and Soil Sciences
Michigan State University

Tammy Keith-Wellstone
Sustainable Farming Association
of Minnesota

Jim Tjepkema
Rodale Institute

FARMERS:

Devin Ellinghuysen
Carmen Fernholtz
Robert and JoAnn Fogg
Roger French
Tom Guthrie
Michael Hartman
Terry and Sheila Holsapple
Ron Keller
Roy Michaelis
Greg Mund
Dale and Carmen Pangrac
Ray Radatz
Tim Reed
Michael Rupprecht
Dick and Sharon Thompson
Alan Wood
Jerry Wirbel
Eugene Zins

Funding:

SARE: \$130,000

Duration:

September 1993 - April 1996

Objectives were: 1) To evaluate annual medic based cropping systems as alternatives to conventional Midwest cropping systems; and 2) To develop educational programs promoting integrated cropping systems that include annual medics. The project on annual medics provided successful interaction of producers with researchers from nonprofit organizations and universities in the Midwest. Producers were involved in planning, conducting, and evaluating the research. Educational activities were conducted which showed the results of our research and which promoted environmentally sound alternative production practices. Research was conducted on-farm and on experiment stations.

Eleven on-farm evaluations were conducted in six states including Illinois, Iowa, Michigan, Minnesota, Ohio, and Wisconsin. On-station research was conducted in Minnesota, Michigan, and in Wisconsin at the Michael Fields Institute. Research examined use of annual medics and other legumes as sources of forage, green manure, and soil cover; as weed smother crops in corn and soybean production systems; and as contributors of nitrogen. Annual medics and berseem clover have potential as emergency forage crops, green manures, and cover crops when planted in the spring or following a small grain harvest in summer. Annual medics have potential to fix up to 150 pounds of atmospheric nitrogen per acre and have a high fertilizer replacement value when used in rotation with corn and canola.

A major emphasis on this project was the use of annual medics as smother crops in corn and soybean production systems. Annual medics seeded before, simultaneously, or after a corn or soybean crop was planted were not a consistently effective weed control strategy. When used as the sole weed control strategy, annual medics often resulted in lower grain yields and economic returns compared to standard crop production practices using herbicides. We evaluated several practices to increase the effectiveness of the medic smother crop system including use of: alternative varieties with contrasting growth habit; alternative nitrogen fertilization practices; and variable times of medic planting.



Future Farmers in Sustainable Agriculture

Final Report

Project Coordinator:

Jan O'Donnell
Executive Director
Minnesota Food Association
2395 University Ave., Room 309
St. Paul, MN 55114
612-644-2038
612-646-0142 (fax)
odonn014@email.umn.edu

Team Members:

Patricia Love
Consultant

Minnesota Institute
for Sustainable Agriculture

Funding:

SARE: \$20,800

Duration:

October 1994 - September 1996

The Minnesota Food Association's Future Sustainable Farmer Project attempts to describe background and skills successful 21st century sustainable farmers will require and offer insights into their traits, attitudes, and social priorities. The purpose is to help address educational and community barriers with which future sustainable farmers are faced. Quite often, sustainable farmers find that publicly funded institutions do not provide information, education, and training they need. Meanwhile, they may be faced with a lack of support from those who look with suspicion on their practices. The future of a reliable and safe food source, healthy communities, clean water, and productive land may rest to a large extent in the hands of tomorrow's farmers and today's educators.

The results of this report and the dialogues form the basis of a job description that highlights the background, skills, knowledge, education and experience a future farmer will require. The skills and knowledge identified in the study will also be compared with the various land-grant curricula to determine how well university courses match needs of future sustainable farmers. In addition, the Minnesota Food Association has begun work with land-grants to increase and enhance universities' sustainable agriculture offerings. The profile of the sustainable farmer of the future will not mirror that of farmers of previous generations. The farmer of the future may or may not have grown up on a farm; the future farmer may have lived his or her entire life in the city. The future farmer may be a man or a woman, born in the U.S., or elsewhere. One certainty is that the traditional image of a farmer is likely to change. The sustainable farmer of the future will do more than just grow food, raise animals, and make a profit to support the family; he or she will serve as an educator, protector of the land, and community builder. The future sustainable farmer will require patience and ability to think and plan long-term. Significant manual and intellectual work as well as special management skills will be required. The future farmer will view quality of life and living within his or her natural and financial means as a top priority.

To help future sustainable farmers acquire and maintain skills they will need to farm sustainably, educational institutions will have to rethink not only what they teach, but how they teach it and who they view as their customers. Land-grant institutions are in the position to lead the way with programs geared at preparing students from a variety of backgrounds to become farmers and help current farmers to improve their skills. Effort should also be made to encourage greater exchanges between researchers and farmers so that the work the universities produce is sure to match the needs of their intended audiences, which will include in increasing numbers sustainable farmers.



Biological, Financial, and Social Monitoring to Develop Highly Sustainable Farming Systems

Final Report
(see also page 51)

Project Coordinator:
George Boody
Land Stewardship Project
2200 Fourth St.
White Bear Lake, MN 55110
612-653-0618
612-653-0589 (fax)
boody@gold.tc.umn.edu

Team Members:
Deborah Allen and Jay Dorsey,
Department of Soil Science
Cornelia Flora, Iowa State University
Larry Gates,
Department of Natural Resources
Mary Hanks,
Minnesota Department of Agriculture
Tex Hawkins,
U.S. Fish and Wildlife Service
Larry Johnson,
Larry L. Johnson and Associates
Richard Levins,
Agriculture Experiment Station
Helene Murray,
MN Institute for Sustainable Ag
Bruce Vondracek,
MN Cooperative Fish
and Wildlife Research Center
Craig Schaeffer,
University of Minnesota
David Ziegler,
Experiment Center
Don Olson,
Minnesota Extension Service
FARMERS:
Roy Michaelis, Bob Finley,
Don Andring, Charles Nelson,
Ted Humfeld, Steve Kutzler,
Jodi Dansingburg, Joe and Marlene
Finley, Dan and Muriel French,
Doug Gunnink, Ralph and Geri
Lentiz, Alison Meares,
Dave and Florence Minar, Richard
Ness, Mike and Jennifer Rupprecht,
Laurie Sovell, Julia Frost,
Art and Jean Thicke
OTHER:
Sustainable Farming Assoc. of MN
Cannon River Watershed Partnership
White Water Joint Powers Board

Funding:
SARE: \$50,000
ACE: \$50,000

Duration:
October 1994 - September 1996

The Monitoring Team completed a third year of research and education designed to test a process of on-farm observation and interaction that brings together farmers and other professionals. The Team of 24 people combines agricultural disciplines, ecology, rural sociology, hydro geology and the perspectives of farmers, agency officials, researchers, consultants and nonprofit staff. The project has focused on farms in transition to Management Intensive Grazing (MIG).

In 1996, the Team: collected analytical data on the six team farms and paired farms (nearby farms with similar soils or stream reaches); documented farmer observations; and tested selected on-farm indicators. For example, the Team collected soils data from 54 permanent plots on the six team farms and five paired farms. In addition, infield comparisons led to identification of five soil monitoring tools to be included a monitoring tool box. Breeding bird and breeding frog and toad counts were conducted by volunteers and farm families. Information was collected from streams on four team farms and three paired sites on the same or adjacent streams.

Several preliminary findings suggest that MIG has broad ecosystem and socioeconomic benefits. Rested paddocks show promise as nesting sites and cover for endangered grassland bird species. MIG stations on two streams improved chemical, physical and biological parameters when compared to continuously grazed stations. A set of four economic indicators of sustainability show that the advantages of grazing go beyond profitability.

We are developing a tool box of monitoring indicators that can be used by farmers to see if they are making progress toward their goals. The tool box will contain narrative and visual aids from all the research areas and will encourage farmers to use a holistic management process. The Team will produce a prototype tool box by February 1997 that will be evaluated next year on at least 10 farms not associated with the existing Team.

The Team held five field days from June to September, involving a total of 240 people. Two articles were written in reference to the project in major popular publications. One article was accepted for scientific publication and at least 29 presentations were given by Team members since January 1996. Dick Levin's publication, *Monitoring Sustainable Agriculture With Conventional Financial Data*, has been distributed to more than 440 people.



Weed Control for More Sustainable Soybean Production

Annual Report

Project Coordinator:

Nicholas Jordan
University of Minnesota (UM)
Department of Agronomy
and Plant Genetics
411 Borlaug Hall
St. Paul, MN 55108
612-625-3754
612-625-1268 (fax)
jorda020@gold.tc.umn.edu

Team Members:

Donald Wyse
Department of Agronomy
and Plant Genetics
UM

Gregg Johnson
Southern Experiment Station
UM

Carmen Fernholz
Farmer

Leonard Marquardt
Farmer

Funding:

SARE: \$80,000
ACE: \$7,262

Duration:

September 1995 - August 1997

Weed management has focused on tillage and selective herbicides to reduce the impact of weeds on crop yields. While effective, chemical and mechanical control has led to excessive soil erosion, herbicide resistant weeds and contamination of surface and groundwater. Alternative weed control methods including weed competitive crops and biological control are now being investigated. Field studies were conducted in 1995 and 1996 to determine the effectiveness of the bacterial biocontrol, *Pseudomonas syringae* *pv.* *tagetis* (PST) and competitive soybean cultivars, for control of Canada thistle. These experiments were conducted under organic and no-till production systems.

In 1995, PST was ineffective in both production systems due to reduced viability of bacteria in the spray application. In 1996, PST significantly reduced Canada thistle height in the organic production system. PST provided effective weed control under both levels of tillage and with both competitive and noncompetitive soybean cultivars. There was no significant difference between soybean cultivars in their ability to suppress Canada thistle height. PST had no significant effect on soybean grain yield of either cultivar. An integrated system of the competitive soybean cultivar Kato' and the biological control agent PST appears to have the most promise for nonchemical weed control of Canada thistle. Data collected from the two no-till locations in 1996 is not completely analyzed yet, so will not be presented in this annual report. In May of 1996 we began to initiate a broad-based cooperative research approach to integrated cultural and biological weed management. We are developing a research cooperative in weed science that involves farmers, other agriculturalists and university research and extension workers. Our overall goal is to have broader public participation in how research is conducted.



Obstacles to Market Access for Family Farm Hog Producers

Proposal

Project Coordinator:
Mark Schultz
Director of Policy Program
Land Stewardship Project
14758 Ostlund Trail North
Marine, MN 55047
612-433-2770
612-433-2704 (fax)

Team Members:
Dana Jackson
Associate Director
Land Stewardship Project

Dennis Timmerman
Farm Policy Committee
Land Stewardship Project

Lynn Hayes
Attorney
Farmers' Legal Action Group, Inc.
(FLAG)

Randi Ilyse Roth
Executive Director
FLAG

Theresa Keaveny
Staff Director
Dakota Rural Action (DRA)

Norm Perrity
Farmer

Gary Hoskey
Farmer

Barbara Grabner
Assistant Director
PrairieFire Rural Action (PFRA)

Sarah Vogel
Commissioner of Agriculture
State of North Dakota

John Helmuth
Director of International Programs
Center for Agricultural
and Rural Development
Department of Economics
Iowa State University

Funding:
SARE: \$50,180

Duration:
September 1995 - August 1997

Independent farmers in the North Central Region are successfully developing sustainable, low-cost production practices in whole-farm systems that integrate crops, forage, and hogs. However, changes in the structure of agriculture threaten the economic viability of these farmers. Large-scale hog-confinement operations linked to large packing companies exert market power that limits market access by independent, small- and moderate-scale producers. To increase public understanding of this issue, we propose a 4-part research and education project that will:

- 1) Document the problems experienced by small- to moderate-sized farmers in finding competitively priced markets for their hogs. Land Stewardship Project (LSP), PrairieFire, and Dakota Rural Action (DRA) will gather firsthand narrative accounts from farmers who have been affected by changes occurring in the structure of the hog industry; 2) Assess the economic impact of packer concentration and vertical coordination on family farm hog production. We will review findings of previously published studies on the economic impacts of packer concentration and vertical coordination on livestock producers. Included in this analysis will be a discussion of the packer concentration and vertical integration studies due to be issued by the Packers and Stockyards Division of USDA in the fall of 1995; 3) Complete a legal analysis of whether packer concentration levels and methods of vertical integration comply with the Packers and Stockyards Act and its implementing regulations. Farmers' Legal Action Group (FLAG) will complete this analysis; and 4) Publish and disseminate findings of the three studies and stimulate discussion leading to new strategies to secure market access for sustainable hog producers.

This project will examine one of the most critical issues confronting sustainable agriculture today: fair competition and access to markets in the hog industry, and it will explore how enforcement or reform of the Packers and Stockyards Act could affect sustainable agriculture. Results of the project will be a better understanding of structural changes that are needed to provide more opportunities for sustainable agriculture.



Experiential Learning Activities for an Undergraduate Minor in Sustainable Agriculture Systems

Proposal

Project Coordinators:

Craig Sheaffer
Steve Simmons
Mary Brakke
University of Minnesota (UM)
411 Borlaug Hall
1991 Buford Circle
St. Paul, MN 55108
612-625-7224
612-625-1268 (fax)
sheaf001@maroon.tc.umn.edu

Team Members:

Bruce Barnett
Director and Professor
College of Education
University of Northern Colorado
(UNC)

Patricia Lee
Associate Professor
Special Education
UNC

Cris Carusi
Executive Director
Nebraska Sustainable
Agriculture Society

Clive Edwards
Professor
Department of Entomology
Ohio State University

Charles Francis
Professor
Extension Crop Specialist
Agronomy
University of Nebraska

Dana Jackson
Associate Director
Land Stewardship Project

Ricardo Salvador
Assistant Professor
Department of Agronomy
Iowa State University

Funding:
SARE: \$122,732

Duration:
September 1996 - August 1998

Experiential learning provides unique opportunities to meet the needs of highly interdisciplinary areas of study such as sustainable agriculture while also providing opportunities for developing skills that are needed to design and implement sustainable food systems. This project will apply experiential learning theory to the development of two experience-based courses in sustainable agriculture as a way of integrating abstract concepts and practical experience. University educators, practitioners, and community organizations in Minnesota, Iowa, and Nebraska will be involved in the development and use of an experience-based curriculum for sustainable agriculture education. Fundamental to the success of these efforts will be to lay a foundation of understanding of experiential learning theory and strategies among university educators, practitioners, and community organizations with whom students will be working.

The objectives of this project are to: 1) Develop and present workshops that will introduce educators and intern hosts to experiential learning theory and instructional approaches. Education specialists will present experiential learning workshops for faculty and intern hosts, and will advise on the design of instructional approaches, learning materials, and assessment methods; 2) Develop curriculum and learning materials for two courses aimed specifically at engaging students in the full cycle of experiential learning. The first course will be a field course that focuses on sustainable agricultural systems and practices in the North Central Region. Emphasis will be on understanding interactions and on appraisal of whole-system sustainability. The second course will be a seminar course that students take during or following their internship. Using materials and activities developed through this project, students will be required to purposefully reflect on their experience, form broad concepts, and apply their understanding in new situations; and 3) Establish a regional network of farmers, community organizations, agribusinesses, and public agencies engaged in implementing, analyzing, or promoting sustainable food systems. Members of this network will host student interns enrolled in universities in the North Central Region.

Experiential learning activities developed through this project will form an integral part of the minor in Sustainable Agriculture at the University of Minnesota and the minor in Sustainable Agricultural Systems offered through the North Central Institute for Sustainable Systems, a recently established institute comprised of universities throughout the 12-state North Central Region. Courses and curriculum developed through these efforts will be made available to students and faculty at any of the Institute's member schools. Together, these efforts will increase acceptance of experiential learning as a valid and essential approach at universities and will promote students' understanding of the goals of, and approaches to, sustainable food production.



Packaging, Testing, and Disseminating a Set of Indicators for Ecological, Financial, and Social Monitoring on Farms

Proposal
(see also page 47)

Project Coordinator:

George Boody
Land Stewardship Project
2200 Fourth St.
White Bear Lake, MN 55110
612-653-0618
612-653-0589 (fax)
boody@gold.tc.umn.edu

Team Members:

PRODUCERS:

Dave Minar
Dan French
Joe Finley
Mike and Jennifer Rupprecht
Art Thicke

University of Minnesota (UM):

Deborah Allen,
Department of Soil, Water
and Climate
Richard Levins,
Department of Applied Economics
Jay Dorsey,
Agricultural Engineering

OTHER:

Cornelia Flora,
Iowa State University
Helene Murray,
Minnesota Institute
for Sustainable Agriculture
Mary Hanks,
Minnesota Department of Agriculture
Larry Gates,
Department of Natural Resources
Arthur Hawkins,
U.S. Fish and Wildlife Service
Larry Johnson,
Hydro Geological Consultant
Beth Waller,
Vegetation Team Consultant
Audrey Arner,
Western Minnesota Program

Funding:
SARE: \$88,000

Duration:
September 1996 - August 1998

This proposal seeks continuing support for a project begun in 1993 that received two years of funding from SARE/ACE ending in September 1996. The project addresses biological, economic, and social issues related to Management Intensive Grazing (MIG) systems and helps to forge stronger links between farmers and university, agency and other community members. After completing three years of research in late 1996, the Monitoring Team will have developed a set of diverse indicators/measures of sustainability, and tested these on-farm monitoring tools for scientific significance and farmer usability. We also will have documented our collaborative team process with a Team of 18 scientists, farmers, consultants, and agency and nonprofit staff.

There are four objectives for this proposal. The Team will: 1) foster the use of on-farm monitoring and an interdisciplinary, farmer-driven team process; 2) produce a package or tool box of indicators that helps farmers and agricultural professionals evaluate the sustainability of management practices; 3) field test a prototype tool box on at least 10 farms that employ a variety of farming systems; and 4) disseminate the tool box through field days, workshops, presentations and written materials.

The Team will meet during the two years of proposed activity and identify and work with a total of three formative and established resource management groups (RMGs) in different areas. Consultant support groups comprised of Monitoring Team members will meet with RMGs to aid in exploration of Team process and the use of the indicators in their settings. We will develop guidelines on how to adapt the essential elements of our Team process. The Team will identify 10 farmers to review and use the prototype tool box of indicators, and their comments will help produce a first edition of the tool box in 1998. The tool box and monitoring approaches will be disseminated through field days. We intend to reach 500 farmers and other individuals. Additionally, we will prepare articles for the farm press. To facilitate dissemination to researchers and educators not in Minnesota, we will write articles for the scientific community which emphasize results from data collected using standard scientific methods. All members will be involved in dissemination activities, selection of Test Farmers and RMGs, and evaluation of the project.

Networking and building long-term relationships are a key focus of the Team. The Team will assist farmers and other agricultural professionals to more carefully observe the impacts of farming practices, including livestock production, to determine if they are environmentally sound. Several of the indicators have been developed to improve observation of management impacts on sensitive lands such as stream banks and riparian corridors.



People to People: Sustainable Agriculture Networking for Farmers and Rural Communities

Proposal

Project Coordinators:

Carol Ekarisu and DeEtta Bilek
Sustainable Farming Association
of Minnesota-Central Chapter
R.R.1 Box 4
Aldrich, MN 56434
218-445-5494
218-445-5673 (fax)

Team Members:

Helene Murry
Minnesota Institute
for Sustainable Agriculture

Audry Arner
Land Stewardship Project

Mary Brakke
Sustainable Agriculture
Systems Minor

Kerry Lindgren
Staples High School

Gary Huber
Practical Farmers of Iowa

Mark Kennedy
MO Forage and Grasslands Council

John Bobbe
Great Lakes Basin Intensive
Rotational Grazing Network

Sue Retka-Schill
Northern Plains Sustainable
Agriculture Society

Jerry Jost
Kansas Rural Center

Kathy Hadley
National Center
for Appropriate Technology

ATTRA

FARMERS:

June Varner and Stan Estes
Michael Martin
Principal
Parkers Prairie Elementary School

Funding:

SARE: \$97,000

Duration:

September 1996 - August 1998

The Sustainable Farming Association (SFA) of Central Minnesota is a farmer run, information sharing network whose focus is to share ideas about farming practices and systems that can make our farms, families, and communities more sustainable. We do this through farm tours, workshops, and grazing group meetings.

The People to People project provides continuation and expansion of our networking and educational programs. The project includes four components, each designed to facilitate farmers and community members understanding of sustainable agriculture practices and issues. The components include:

1) Whol-Farm Planning – Through workshops and meetings we will work with farmers to explore whole-farm planning. Over two years we will sponsor workshops on holistic resource management, biological monitoring, and other topics that will help farmers to look at their farms as a whole, for example agroforestry, manure management, and watershed improvement. Farmers will learn techniques that balance economic, environmental, and social concerns within the framework of family and community goals.

2) Regionalize Grazing Networks – Grazing networks exist in each state in the North Central Region. Our project will offer farmers who participate in grazing networks the opportunity to travel to other grazing network meetings in their own state or in other states in the region. This will facilitate the movement of knowledge between farmers from all over the region. With our grazing collaborators, we will try to establish round robin scheduling of grazing meetings so farmers can “make a circuit” of grazing meetings. Funds will also be available for extension personnel and other ag professionals.

3) Direct Marketing – Through workshops and meetings we will assist farmers in developing the skills necessary to direct market their crops or add value through production techniques. The Chapter will provide technical support for groups of farmers investigating the feasibility of developing value-added products and cooperatives.

4) Sustainable Agriculture Curriculum – Educating the public about sustainable agriculture has become a priority of the SFA Board. We will develop a series of curriculum for grade school and high school children, including video productions. Students and teachers from local school districts will actually participate in the development of the curriculum.



Pasture-Based Beef Finishing Systems

Annual Report

Project Coordinator:

Fredric A. Martz
University of Missouri (UM)
Forage Systems
Research Center (FSRC)
21262 Genoa Road
Linneus, MO 64653
816-895-5121
816-895-5122 (fax)
Forage_Systems_Research_Center
@muccmail.missouri.edu

Team Members:

UM:
Andrew Clark
Meat Science

Hildegard Heyman
Food Science

Kevin Moore
Agricultural Economics

Jim Gerrish
Co-Investigator
FSRC Staff

Valerie Tate
Co-Investigator
FSRC Staff

FARMERS:
Martin Turner

Kevin Martz

John Wood

OTHER:
Byron Mott
Rockville Meat Co.

Chris Zumbrunnen
Extension Livestock Specialist

Tim Clapp
Grassland Conservationist
NRCS

Funding:

SARE: \$60,000

ACE: \$51,817

Duration:

October 1994 - May 1997

The second year of a two year study is nearing completion. The study was designed to research the finishing of beef cattle on pasture without the use of a confinement feedlot. Such a finishing system has the potential of economizing the cost of gains and disperses the animal waste over a broad pasture area where it can be utilized as soil nutrients to grow more pasture. Varying numbers of 700 to 800 pound crossbred steers were randomly allocated according to appropriate stocking rates to five experimental treatments. Treatments were as follows: 0) pasture + no grain supplement; 25 percent) pasture + grain supplement to supply 25 percent of animal nutrient requirements; 50 percent) pasture + grain to supply 50 percent of requirements; 75 percent) pasture + grain to supply 75 percent of requirements; and FL) feedlot ration containing 10 percent ground hay with no pasture. Each intensively managed pasture was eight acres grazed from April 30 to Nov. 5-7, 1996.

Steers gained more rapidly with each increment of grain supplement fed which resulted in the 0 grain group having the least finish and the feedlot group having the most finish. Ninety percent of the feedlot steers graded choice whereas all but four of the 0 grain supplemented group graded standard. The low grades for the 0 and 25 percent groups of steers were because they were about 100 pounds lighter in weight at slaughter than the FL and the 75 percent steers. Had these steers been fed an additional 30 to 45 days, they would have been of equal finish. The steers were removed from pasture because the pastures were exhausted and because a major focus of this study is meat flavor analysis. Therefore, we wanted to slaughter directly off pasture so as not to affect flavor by some other type of ration. Fat color was not a problem since all carcasses were relatively light in color. Sensory descriptive and acceptability, as well as tenderness evaluation of the 1995 samples of beef loin indicated that the eating quality of all beef was acceptable. The pasture finished beef was of less quality compared to the feedlot finished but the 75 percent supplement group was more like the feedlot finished beef.



Fresh to Processed: Adding Value for Specialty Markets

Annual Report

Project Coordinator:

Denise R. Durham
P.O. Box 551
Ashland, MO 65010
573-657-1177
573-657-1347 (fax)
ddurham@mail.coin.missouri.edu

Team Members:

Earnie Bohner
Farmer/Consultant
Value-Added Processor

Nancy Lee Bentley
Consultant
Food Distribution Specialist

Don Osburn
Professor
Agricultural Economics
University of Missouri (UMC)

Doug Holt
Associate Professor
Food Science
Extension Specialist in Processing
UMC

Jim Anderson
Domestic Marketing
Horticulture Specialist
Missouri Department of Agriculture

Funding:
SARE: \$67,000

Duration:
September 1995 - September 1997

The goal of this project is to educate farmers who are also, or who may wish to become, value-added processors so that they understand the many facets of growing crops or livestock for processing/packaging, how to proceed with processing and how to market their finished product(s) for maximum profitability and economic sustainability.

Two surveys were constructed, one for specialty market retailers and another for current value-added producers. The Specialty Market Survey asked retailers to explain their current practices with regard to direct marketers of food or other agriculturally related items, as well as demographic information such as location, types of customer (tourist or local, etc.), and sales volume. The Value-Added Producer Survey requested specific information on products produced, ingredients/supplies produced on the farm, packaging/labeling choices and regulations, and where the products are being sold.

Both surveys have been conducted and their results are being tabulated for survey reports. Results from the reports will be available through Missouri Department of Agriculture and used to fine-tune the training sessions which will be held in 1997.

The manual for the training sessions is currently being written with an emphasis on self-assessment. That is, during the course of presenting the information, each farmer/participant will be asked to apply the information to their present or potential situation to help determine the suitability of their operation to value-added production and direct marketing.

Many of the Specialty Market Surveys and Value-added Producer Surveys were conducted in person to develop relationships within the project and subsequently make retailers and producers aware of future opportunities for business relationships.

In addition to preparation for the training sessions, research into the feasibility of a marketing cooperative for value-added producers and the feasibility of a kitchen incubator have been started. Preliminary responses from producers indicate that marketing is often the most difficult part of their duties, and many have expressed excitement at the possibility of a marketing cooperative.

Although the project has entered its second year, the survey construction and implementation process has taken a great deal of time, a little more than anticipated, and results are not yet ready. However, the project is progressing according to plan and gaining momentum as we begin to schedule training sessions.



Developing Sustainable Hog Markets and Slaughtering Arrangements for Family Farmers in Missouri

Proposal

Project Coordinator:

Douglas Constance
Department of Rural Sociology
University of Missouri (UMC)
310 Jesse Hall
Columbia, MO 65211
573-882-7560
573-884-4078 (fax)
GRANTSDC
@MIZZOU1.MISSOURI.EDU

Team Members:

UMC:

J. Sanford Rikoon
Rural Sociology

Don Osborn
Agricultural Economic

Andrew Clarke
Food Science and Human Nutrition

John Ikerd
Agricultural Economics

OTHER:

Russell Kremer
Osage Independent Pork Producers
Association (OIPPA)

Rick Stumpe
OIPPA

Mark Russell
Advisor
Fatima Adult Agriculture Program

Funding:
SARE: \$83,762

Duration:
September 1996 - August 1998

Limited market access and slaughtering alternatives are key constraints to the development of sustainable agriculture systems which support viable family farms, vibrant small towns, clean water and air, and opportunities for young farmers. The creation of locally owned value-added (LOVA) enterprises which integrate sustainable practices with marketing alternatives is the best way to overcome these constraints.

The objective of this project is to increase the Osage Independent Pork Producers Association's (OIPPA) control over their production, slaughter, and marketing processes through enhanced product marketing and slaughter access. To reach this goal, sustainable agriculture researchers will provide technical and educational support to ongoing efforts by the OIPPA related to enhanced product quality, niche-market development, and alternative slaughter arrangements. A consultant and a scientist will identify, visit, document and analyze cases of successful and failed sustainable pork production, slaughtering, and marketing enterprises. This information will be used to inform the parameters of at least two feasibility studies – one on niche-market development of LOVA pork products and the other on alternative hog slaughtering arrangements.

The diverse research team consists of five agricultural scientists, two farmer-members of the OIPPA, a nonprofit organization representing over 180 mid-Missouri hog farmers, and one alternative livestock producer with extensive experience in marketing and product development.

The results of this research will be OIPPA's greater control over their production, slaughtering, and marketing processes. This greater control will support the continuance of a family farm system of hog production in mid-Missouri that sustains rural communities and environments. This information will be disseminated through Adult Agriculture Education Programs, Young Farmers Organizations, extension channels and publications. This project will provide research relevant for several SARE priority areas including: Sustainable Livestock Systems, Developing Markets, and Emerging Issues.



Impact of Tree Windbreaks on Distribution of Insect Pests and their Natural Enemies in Sustainable Agricultural Systems

Annual Report

Project Coordinator:

Robert J. Wright
University of Nebraska (UN)
South Central Research
and Extension Center
Clay Center, NE 68933-0066
402-762-4439
402-762-4422 (fax)
SCRC009@UNLVM.UNL.EDU

Team Members:

UN:
M. Dix
Department of Entomology
USDA Forest Service

M. Harrel
Department of Forestry,
Fisheries and Wildlife

J. Brandle
Department of Forestry,
Fisheries and Wildlife

R. Johnson
Department of Forestry,
Fisheries and Wildlife

L. Hodges
Department of Horticulture

FARMERS:
Ron Raikes

Ray Otto

Jerry Newsham

Funding:
ACE: \$99,500

Duration:
September 1992 - February 1996

Vertebrate and invertebrate (insect) natural enemies of insects and insect pests were sampled periodically during 1993-1994 in crop fields (corn, soybeans, grain sorghum, wheat and cantaloupe) sheltered and unsheltered by tree windbreaks. Field margins of these fields and tree windbreaks were also sampled. Crop fields with and without adjacent woody areas with waterways (riparian areas) were also sampled for bird species. Bird species were sampled by standard census observation procedures. Insects were sampled by sweep nets, pitfall traps, sticky traps and tree beating techniques, depending on the habitat. Few birds were observed in crop fields during the winter. Bird abundance in crop fields adjacent to either woody or herbaceous edges did not differ during any season except spring 1994. During this sampling period a greater number of birds were seen in fields adjacent to windbreaks. Similar to bird abundances, mean species richness in crop fields adjacent to windbreak and herbaceous edges did not differ. Patterns of bird use within the field were evaluated. Higher bird densities were found within 100 meters of the edge in spring 1993, within 50 meters in late summer 1993 and 1994, and within 25 meters in spring and summer 1994. No consistent differences were found in patterns of bird use across fields due to edge type. In fields adjacent to windbreaks, American robins, brown-headed cowbirds and brown thrashers had a greater percentage of observations within 50 meters of the windbreak, whereas horned larks had a greater percentage of observations between 100 and 200 meters from the edge. In fields adjacent to herbaceous fence rows, only dickscissels showed an increased density within 50 meters of the edge. Horned larks showed an even distribution throughout the field.

Overall, field edges with woody windbreak vegetation had greater species richness and more individuals than did non-woody edges. However, the greater number of birds in the woody edges was not reflected in the number of birds using the fields except during spring. In general, bird densities in fields were greater near field edges than at distances further into the field, but open-area species such as horned larks (*Eremophila alpestris*) were more prevalent away from woody edges. Spiders were most abundant close to windbreaks and grassy field edges. Spider numbers were also higher in windbreaks containing coniferous trees compared with sites dominated by deciduous trees. In sheltered and unsheltered cantaloupe fields, fewer arthropods were caught on sticky traps in fields sheltered by tree windbreaks, compared with unsheltered fields. Lady beetles (a predatory insect) were more abundant at sheltered sites and cucumber beetles (a pest insect) were more abundant at unsheltered sites. Windbreak and other vegetation characteristics have been recorded at each site and will be analyzed for correlations to vertebrate and invertebrate survey data. Yield data has been collected from crop fields but are not summarized or statistically analyzed.



Low-Input Beef Cattle Systems of Production

Final Report

Project Coordinator:

Terry Klopfenstein
University of Nebraska (UNL)
C220 Animal Sciences
Lincoln, NE 68583-0908
402-472-6443
402-472-6362 (fax)

Team Members:

UNL:
Stephen Carl Mason
Agronomy

Alice Jones
Agronomy

Jim Gosey
Extension Specialist

Rick Rasby
Extension Specialist

Bruce Anderson
Extension Specialist

Rick Stock
Extension Specialist

FARMERS:
Al Svajgr

Rob Ravenscroft

OTHER:
George Pfeiffer
Economist

Funding:
SARE: \$70,686

Duration:
September 1993 - August 1995
(Final Report received January 1997)

This research project involves growing-finishing beef systems and the interaction with corn tillage system. Ridge-till corn was developed and compared to conventional tillage as a source of cornstalks for wintering beef calves. Tillage system had little effect on calf growth. There was greater trampling in the furrows than in the conventional fields and therefore fewer grazing days. The calves did not affect the ridges. Corn production during the following cropping seasons was measured on grazed and ungrazed areas. Grazing did not impact corn production on either ridge-till or conventional systems.

After stalk grazing, the calves were fed alfalfa hay until grass was available. The cattle grazed eight different pasture systems until early September or early November when they entered the feedlot for finishing on high grain diets. Red clover interseeded into smooth brome increased cattle gains and eliminated the need for nitrogen fertilization during one year but stands could not be maintained. Rotating the cattle from brome to warm-season grass or to Sandhills range increased cattle gains. Allowing the cattle to graze brome regrowth, turnips, cornstalks, and rye during the fall increased the weight of the cattle entering the feedlot. Feedlot performance of the cattle was measured and economics calculated for the eight grazing systems. Systems with greatest forage gains were the most economical.



Sustainable Agriculture Mentor Program

Final Report

Project Coordinator:

Timothy A. Powell
706 Douglas St.
Wayne, NE 68787-1325
402-375-1944
402-375-1946 (fax)

Team Members:

Nebraska Sustainable
Agriculture Society

University of Nebraska

Center for Rural Affairs

FARMERS:

Jim Bender
Dennis Demmel
Ron Ellermeier
Mike and Sue Grant
David Hansen
Gerald Henzler
Mike Herman
Tom Higgins
Arnold Jones
Ben Jones
Tom Larson
Wyman McCain
Ron Miller
Billene Nemecek
Bryce Ritz
Warren Sahs
Joel and Jim Starr
Tom Tomas
Michael Wiest
Dave Welsch
Gary Young

Funding:

SARE: \$59,427

Duration:

September 1993 - August 1996

We recruited 18 mentors at the start of the Nebraska Sustainable Agriculture Mentor Project. These mentors reflected a geographical and subject expertise dispersion. During the remaining years we did not actively recruit additional mentors but added mentors when a need existed, either through a contact and need from a mentee farmer or through a perceived gap in coverage, geographical or subject area. We lost a few mentors over the life of the project but also added a few to end with 20 mentors.

A mentor handbook was developed in year one. It was used throughout the project as a reference for mentors in the project process and procedures. Contact was made with the mentors from time-to-time to check on progress of the mentoring process and to inform them about professional improvement (PI) activities (meetings, farm tours, and other educational activities and opportunities). Some of the mentors took advantage of the PI aspect of the project and some did not. Time was given as the most limiting resources or constraints by mentors to attending educational activities. Project publicity and promotional efforts were conducted throughout the life of the project. Efforts included newsletters (Nebraska Sustainable Agriculture Society newsletter, Center for Rural Affairs newsletter, and the Center for Sustainable Agricultural Systems newsletter), newspaper and magazines articles (*Norfolk Daily News*, *The New Farm*, *Nebraska Farmer*, others). Project brochures were sent to all the major agriculture agencies (FmHA, SCS, ASCS, [old names], and Extension). The project was also promoted at a number of agriculture meetings by UNL Extension and Nebraska Sustainable Agriculture Society (NSAS) staff - NSAS Western and Annual meetings, and the Nebraska Cooperative Extension Association annual meetings. Mentors were encouraged to give presentations at agriculture meetings and some of them did so. Mentors were also encouraged to give farm tours that highlight their operations. Again, many of them did so.

Results from evaluation of program participants conducted at the end of the project showed that farmers like one-on-one mentoring (rated good by mentors). Nearly 90 percent of the participants said that the project should continue, even if no further funding was secured. Participants in general were very pleased with the project. Almost 70 percent of the mentee farmers said that they changed their operation as a result of working with a project mentor. Of those that didn't change their operation the most common answer was timing was not right for change. Only 35 percent of the farmer mentees said that they changed their thinking about sustainable agriculture due to working with a project mentor. Those that didn't change their thinking went on to say that they already were in agreement with sustainable agriculture.



Estimation of Reduced Machinery Ownership Costs in Diversified Cropping Systems

Annual Report

Project Coordinator:

Glenn A. Helmers
Department of Ag Economics
University of Nebraska (UNL)
205 Filley Hall
Lincoln, NE 68583-0840
402-472-1788
402-472-3460 (fax)

Team Members:

Joseph Atwood
Associate Professor
Agriculture Economics
Montana State University

Kevin Bernhardt
Department of Ag Economics
UNL

Funding:

SARE: \$29,544

Duration:

October 1994 - September 1996

From an environmental/agronomic perspective, crop rotations have long been considered to be a pillar of holistic planting; however, the economic advantages have not been fully understood or explained. In particular, current economic analyses and cost data related to diversified cropping systems have significant limitations because so little is known about the economic advantages resulting from reduced machinery investment arising from reduced timeliness pressure under multiple cropping. A common perception is that sustainable agriculture farmers are efficiently using their resources from an environmental perspective, but they have forfeited economic benefits in order to do so. Sustainable farmers are therefore often considered to be environmentally sustainable, but not economically sustainable. However, the potential cost-saving phenomenon related to certain multiple and rotational cropping systems may not be properly accounted for. Once cost savings that result from diversified crop mixes and less costly machinery sets are properly accounted for, it may show sustainable farming to be wholly consistent with the economist's theory of profit maximization and efficient use of resources.

A Multiple Integer Linear Programming (MILP) model is used to address project objectives, and is nearly complete. The 300 by 400 matrix endogenizes machinery selection, crop rotations (including choice of corn, soybeans, oats, and alfalfa), labor, pest control alternatives, and opportunity interest costs. The model also includes yield interactions (depending on previous crop) and timeliness windows for completing spring and fall work. The completed model will be able to estimate profitability under various crop rotation-pest control-tillage systems. It will also be able to optimize and allow diversification of tillage and pest control systems within the same farm setting, which is an aspect often overlooked. Finally, various physical environments ranging from flat, highly productive irrigated soils in the central Platte valley to hilly, poor dryland soils in northeast Nebraska can be exogenously set and compared. This will allow determination of optimal systems (or cost of nonoptimal systems) unique to that physical environment region.



Quality of Life Effects of Conventional, Transitional, and Sustainable Production Systems on Rural Communities and Family Farms in the Western Corn Belt

Final Report

Project Coordinators:

John C. Allen
58 Filley Hall
University of Nebraska
Lincoln, NE 68583
402-472-1772
402-472-0688 (fax)
agec008@unlvm.unl.edu

Brenda J. Johnson
Cornell University

Team Members:

FARMERS:
Rod Hassebrook

Daniel Hilger

Thomas Larson

Funding:

SARE: \$37,786

Duration:

October 1994 - October 1996

The relationship between quality of life influencing farm households for three farming system types in northeast Nebraska were the focus of this study. The three farming systems were identified by a cluster analysis of a statewide survey of cropping practices. After identification of three distinct clusters of cropping practices, the three groups were labeled "conventional," "transitional," and "sustainable" (Allen and Bernhardt 1995).

In order to assess the quality of life outcomes associated with the different farming systems and their adjacent communities, three objectives were identified: 1) Analyze the linkages of four whole-farm systems in northeastern Nebraska to surrounding communities; 2) Analyze how these farm systems are perceived to influence local community well-being; and 3) Analyze probable structural impacts of the four systems on farms and rural communities in northeastern Nebraska. Because the assessment of the relationships local farm households have with the surrounding rural community was the objective, this study was carried out in a northeastern Nebraska watershed. Given this objective and associated objectives of the Agriculture in Concert with the Environment (ACE) project, the Lower Platte North Natural Resources District (NRD) was selected.

The study identified trade-offs associated with quality of life, e.g. a farming system could rank high on one or several dimensions of quality of life, but low on others, knowledge which should help farm households and rural communities with planning and priority setting. Two methodologies were used in the study. In-depth qualitative interviews with farm household and local community members will be used to gather information about their concerns regarding local agricultural patterns and their impacts on the rural community. A quantitative survey on quality of life issues related to agriculture and its linkages with the rural community was also used to supplement the qualitative data gathered from the interviews.

Among the major findings were: 1) Farmers saw few differences in farming practices between the farming systems; 2) Each system had different adoptions in mind for the continued viability of their operations; 3) Different norms and quality of life issues pervaded the three farming systems; 4) The significance of the intergenerational and land lease issues in the region; 5) Labor constraints faced by the different systems; and 6) The switch from a nuclear family operation (e.g. husband, wife and children) to father-son or brother partnerships.



Comparing Farming Systems with Different Strategies and Input Levels: A Research/Education Program with Replicated Micro-Farms

Annual Report

Project Coordinators:

Charles Francis and Richard Olson
University of Nebraska (UNL)
Center for Sustainable
Agricultural Systems
225 Keim Hall
Lincoln, NE 68583-0949
402-472-2056 (fax)
402-472-4104
csas002@unlvm.unl.edu

Team Members:

UNL:

Daniel Duncan
Agricultural Research
and Development Center

Bruce Anderson
Department of Agronomy

Terry Klopfenstein
Department of Animal Science

David Mortensen
Department of Agronomy

Doug Jose
Department of Agricultural
Economics

James Brandle
Department of Forestry,
Fisheries and Wildlife

FARMERS:

Bruce Krueger
Mark Gustafson
Jim Bender
Dennis Adams
Ron Ellermeier
Tom Larson
Nebraska Sustainable
Agriculture Society

OTHER:

Pioneer Hi-Bred International
NC+ Hybrids
DeKalb Seed Co.

Funding:

SARE: \$119,054

Duration:

October 1994 - September 1996

Five micro-farms were established for undergraduate students to gain research and practical experience in a whole-farm context. Student interns are comparing alternative management strategies for crop and crop/animal production in five systems: conventional crop rotation, diversified crop rotations, agroforestry with crops and woody perennials, organic cash row crop rotations, and beef production on forage, crop residues, and short feedlot period. Farms are located at the University of Nebraska Agricultural Research and Development Center (ARDC). Four students participated in seminars on sustainable systems, farm planning and economic analysis, projections over multiple years, and energy use efficiency of alternative systems. The team of students and mentors planned the micro-farms, planted and cared for crops and livestock, and harvested after an early frost. Students analyzed yields, economic returns, and energy efficiencies of the alternative systems after the yearlong field project. All four students completed the cycle of spring seminar and summer field research and production experience; two students completed the fall semester.

During the cropping season, the group visited farmer mentors, worked with faculty and graduate students on research projects, took field trips to farms and other research sites, and learned both farm management and team research skills. Students prepared summaries of their planting plan and presented the micro-farm project to visitors to the ARDC. Students finished their final reports on farming activity and compared the results of the five farming systems. Their yields and returns were drastically reduced by drought during a two-month period in mid summer, as well as by an early frost that affected some of the later planted cultivars. Each student extrapolated the results to full-size analog farms that represent current reality in eastern Nebraska. We have developed an informational fact sheet with the crops, varieties, and planting dates for all the farms.

A recruiting brochure was assembled for use in attracting interns for year two. Nine students have accepted internships for the coming year, and we are seeking additional support from industry for expanding the educational experience. A full-color brochure will be published soon to be used for publicity and for attracting industry support.



Improving Sustainability of Cow-Calf Operations with Natural Forage Systems

Final Report

Project Coordinators:

Don C. Adams and Richard T. Clark
University of Nebraska (UN)
West Central Research
and Extension Center
Route 4, P.O. Box 46A
North Platte, NE 69101
308-532-3611
308-532-3823 (fax)
rclark@unlinfo.unl.edu

Team Members:

UN:

Patrick E. Reece
Agronomy

Gene Deutscher
Researcher and Extension Specialist
Beef Cattle Production

Byron Stolzenburg
Extension Educator

Marc Horney
Animal Science and Range Science

Greg Lardy
Animal Science

FARMERS:
Wayne Eatinger
Dave Hamilton
Mike Kelly
James and John Ravenscroft
Rob and Jack Ravenscroft

OTHER:
Ken Hladek
USDA Soil Conservation Service

Will Boyer
Upper Loup
Natural Resource District

Bob Hilske
Middle Nebraska
Natural Resource District

Nebraska Cattlemen

NE Holistic Resource Management

Funding:
SARE: \$82,000

Duration:
August 1994 - September 1996

A beef cow's highest nutrient requirements occur during lactation. We hypothesized that inputs of harvested feeds, labor and other resources would be reduced when high requirements of lactation are matched with the high quality of immature grazed forages. To test this, the traditional calving date of March is compared to a non traditional calving date of June. Cows were bred to calve in either March or June. Inputs (e.g., feed, labor, equipment) and outputs (e.g., beef production) are being quantified and will provide a basis for an economic analysis. The carcass is the end product; however, body weights will allow evaluation of all marketing opportunities. Steer calves born in March are weaned in September and put in the feedlot and finished about June 1. Steer calves born in June are weaned either mid-November or mid-January. Half the calves from each weaning date are put in the feedlot and finished for slaughter in August. The other half are fed a hay diet until May when they graze until September. In September steers from range are put in the feedlot and fed to slaughter in January.

Two weaning dates of June born calves were selected on the basis that November weaning would benefit the cow and January weaning the calf. Cow body condition scores and pregnancy rates do not show measurable benefit to weaning in November, but weaning in January reduced hay fed to calves by 1,779 pounds per calf in 1994 and 923 pounds per calf in 1995. Weights of June born calves were about 10 pounds heavier for calves weaned in January. Harvested feed was reduced for cows calving in June. During 1995, 2,234 pounds of hay was fed to each cow calving in March compared to 0 pounds of hay fed to cows calving in June. During 1996, 3,460 pounds of hay was fed to March calving cows compared to 83 pounds per cow for cows calving in June. An average of 130 pounds per cow of a protein supplement was fed March calving cows and 115 pounds per cow for June cows. Pregnancy rate for March calving cows has been about 93 percent compared to about 95 percent for June cows. At about six months of age March born calves are about 65 pounds heavier than June calves.

Data on steer calves is being collected but are limited because as of September 1996 only one calf crop had completed a full cycle. It is our assessment that labor is lower for June calving cows than for March cows because of reduced feeding and labor. March calving requires sheds and corrals to protect cattle from inclement weather, while June calving is on range. June also appears to have greater marketing opportunities than March. Grazing was extended about three weeks by grazing cool season meadows in May after calving when cows are traditionally fed hay. Cows grazing meadow in May gained body condition score compared to those fed hay, but pregnancy rates and date of calving were not significantly different. Calf weaning weights were 15 pounds higher for cows that had grazed the meadows in May compared to those fed hay in May.



Nebraska Agriculture IMPACT Project

Annual Report

Project Coordinator:

Wyatt Fraas
Center for Rural Affairs
P.O. Box 736
Hartington, NE 68739
402-254-6893
402 254-6891 (fax)
ceruaf01@nol.org

Team Members:

Marvin Lange
Farmer
Board Member
Nebraska Sustainable
Agriculture Society

Cris Carusi
Executive Director
Nebraska Sustainable
Agriculture Society

Chuck Hassebrook
Program Leader
Stewardship and Technology
Center for Rural Affairs

Martin Kleinschmit
Research Associate
Beginning Farmer Sustainable
Agriculture Project
Center for Rural Affairs

University of Nebraska (UN):
Charles Shapiro
Extension Soil Specialist
Northeast Research
and Extension Center

Victoria Mundy
Extension Educator

James King
Associate Professor
Instructional Developer
Institute for Agriculture
and Natural Resources
Communications
and Computing Services

Funding:

SARE: \$106,254

Duration:

September 1995 - August 1997

The Nebraska Ag IMPACT Project supports local groups of beginning and established farmers in demonstrating and learning about sustainable farming systems. Three key agriculture organizations collaborate to provide group organization support, design of on-farm projects, and networking linkages to other farmer groups and organizations.

The IMPACT Project recruits farmers and ranchers to form local sustainable farming IMPACT groups, which include nonfarm community members and local Extension Educators. Local groups will foster community support for and increased adoption of sustainable farming systems. Groups receive staff and funding support for projects of their choosing.

IMPACT supported 13 groups across Nebraska in 1996, including more than 80 group members who controlled over 50,000 acres of farm and ranch land. Public demonstrations of their projects attracted more than 100 more farmers and community members. Group members have credited the group process with encouraging them to try or adopt new practices. Extension advisors have enthusiastically supported IMPACT group projects and have encouraged others to form their own groups. Most of the 1996 groups have reapplied for additional activities in 1997. Additional groups have applied to join the IMPACT network.



Integration of Indigenous Knowledge of Sustainable Agricultural Systems

Planning Grant

Project Coordinator:

Alice Jones
University of Nebraska
254 Keim Hall
Lincoln, NE 68583-0910
402-472-1500
402-472-7904 (fax)
ajones@unlinfo.unl.edu

Team Members:

North Central Region Center
for Rural Development

Iowa State University

Funding:

SARE: \$7,184

Duration:

September 1996 - August 1998

Over 200 producer and research/education grants have been awarded by the NCR SARE/ACE programs since 1988. An enormous amount of indigenous/experiential knowledge has been gained by producers involved with these projects. However, there is no formal method for collecting, translating, compiling and disseminating indigenous knowledge on sustainable agricultural systems. The indigenous knowledge of sustainable agriculture producers must be captured and documented if current and future generations are to learn from the past. Our objective is to identify the best approach(es) to effectively collect, translate, integrate and distribute indigenous knowledge of sustainable agricultural systems to other producers.

Our initial efforts will focus on the organization of an Advisory Task Force composed of four to five farmers/ranchers and one ad-hoc USDA-NAL representative to provide input, data synthesis, feedback and decision making. We will conduct a thematic analysis of the LISA and SARE/ACE research results for use as the basis for the development of key questions to be used in focus groups and telephone surveys. We will lead focus group discussions such that participants develop a more sophisticated set of desirable options for obtaining indigenous knowledge. Through Task Force discussions of these results, topical information will be developed to design content/process prototype information recovery and distribution tools. SARE farmer participants will be interviewed by telephone to determine the information they have to offer and how to best translate such knowledge. The outcomes of the interviews and focus groups will be discussed by the Task Force and a limited number of practices will be highlighted in prototype materials. Prototype materials will be pretested by the Task Force, revised and evaluated by a large number of farmers across the region. The Task Force will review results of prototype materials testing and make recommendations in the final report for future directions of this effort. Positive findings will result in the development of a SARE preproposal in 1998.

The Task Force will be responsible for project input, synthesis of findings, feedback and decision making. The primary grantee (Jones) will be responsible for the thematic analysis, prototype material development and project oversight while the subcontractor (Flora) will take the lead for interview and focus group activities.

We will identify one or more approaches to the transfer of indigenous knowledge that result in a database that is user-friendly, accessible and understandable for the primary user—current and potential sustainable agricultural producers. Priority dissemination media include print, video, color slides, audio tapes, electronic media and interactive computer software.



Increasing Rural Women's Leadership in Sustainable Agriculture and Community Development

Proposal

Project Coordinator:
Cris Carusi
Nebraska Sustainable
Agriculture Society (NSAS)
P.O. Box 736
Hartington, NE 68739
402-254-2289
402-254-6891 (fax)
criscarusi@aol.com

Team Members:
University of Nebraska (UNL):
Chuck Francis
Professor
Extension Crop Specialist
Agronomy
Director
Center for Sustainable
Agricultural Systems

James King
Associate Professor
Instructional Designer

Victoria Mundy
Extension Educator

OTHER:
Wyatt Fraas
Beginning Farmer Sustainable
Agriculture Project Leader
Center for Rural Affairs

Jane Sooby
Western Project Organizer
NSAS

Jill Wubben
Administrative Assistant
NSAS

Linda Kleinschmit
Rural Organizer and Teacher

Twila Weyers
Farmer and Teacher

Funding:
SARE: \$62,820

Duration:
September 1996 - August 1998

Rural women are a powerful resource for sustainable agriculture. The purpose of this project is to increase rural women's proactive participation and leadership in the development of sustainable agricultural systems and communities. Women will develop skills and knowledge they need and identify actions they can undertake to make farms and communities sustainable. Communities and farms are more likely to move toward sustainability if both women and men are involved in making plans and changes. The project will organize and support at least five groups of women in Nebraska. The groups will pursue research, education, and demonstration projects which will address local issues of sustainability. The project will provide opportunities for women in groups to strengthen leadership as they work together toward common goals for farms and communities. The project will improve women's ability to take part in agricultural outreach programs of Nebraska Cooperative Extension and increase women's activity in statewide producer networks.

Project staff will work with Cooperative Extension to recruit at least five rural women's groups. The IMPACT Project will provide small grants for groups to design and carry out unique local projects, which will include public outreach, formal leadership training, and education in sustainable farming practices. Groups will contact local Cooperative Extension personnel and other agency personnel for technical support and attend annual IMPACT Networking meetings, at which members of all IMPACT groups will present work and experiences. Participants have primary leadership responsibility for the IMPACT Project. Members of each group serve on the Project Steering Committee, which makes policy and priority decisions, and recommends groups for funding.

Project staff will work with the women's groups as facilitators and resource people. University of Nebraska will design evaluation tools and will identify leadership and training resources in the University. The women themselves are the most important participants, as they will create and implement plans for their farms and communities to move toward sustainability. General acceptance and understanding of sustainable practices and values will increase as women become involved in the IMPACT Project. Each participant will gain tools to make changes in her farm, home, and community. Some women may take on formal leadership roles at local, state, or even national levels. Cooperative Extension personnel will involve more women in agricultural programs and will become more aware of women's needs for education.

This project will further develop and strengthen the IMPACT network of producers and other agricultural professionals. Women will make this network more effective.



Biologically Intensive Pest Management of Greenbugs, *Schizaphis Graminum (Rondani)*, on Grain Sorghum

Proposal

Project Coordinator:

Z.B. Mayo
Department of Entomology
Room 202 Plant Industry Bldg.
University of Nebraska (UNL)
Lincoln, NE 68583-0816
402-472-8703
402-472-4687 (fax)
entm004@unlvm.unl.edu

Team Members:

Robert Wright
Associate Professor
Entomology
Extension Specialist
South Central Research
and Extension Center (SCREC)

Roger Selley
Associate Professor
Agricultural Economics
Extension Farm
Management Specialist
SCREC

10 Farmers

Paul Hay
Extension Educator

Keith Glewen
Extension Educator

Thomas Dorn
Extension Educator

Funding:
SARE: \$64,800

Duration:
September 1996 - August 1998

In Nebraska, we estimate that less than 50 of our grain sorghum producers consciously consider greenbug resistance when selecting sorghum hybrids. Increased environmental awareness, the uncertain future of cheap insecticides, such as parathion, and widespread occurrence of insecticide resistance indicate that substitution of cheap insecticides for comprehensive pest management expertise may not always be an alternative in the future. If we are to minimize the use of pesticides and maintain profits, use of agronomically acceptable resistant hybrids combined with management of biological/natural control agents must become major components of our sorghum production system in the Great Plains.

Because greenbugs have widespread, naturally occurring parasitoids and predators that are highly effective under some conditions, sorghum pest management presents the unique opportunity of incorporating biological controls into existing pest management recommendations. However, without specific information regarding biological controls and resistant sorghums it is understandable why many producers consider prophylactic applications of insecticides at planting time and curative insecticide applications later in the season as their primary pest management strategies. Therefore, the primary goal of this study is to develop field based management procedures that incorporate plant resistance and biological control into our sorghum management recommendations.

Specific objectives include: 1) Determine economic and biological benefits of greenbug resistant hybrids using on-farm comparisons; and 2) Evaluate and integrate predators and parasitoids, including inoculative releases of parasitoids, into management programs involving greenbug resistant versus susceptible sorghums. Procedures will include small plot, cage studies as well as field-size plots to study the interaction of greenbugs and biological/natural control agents in resistant and susceptible sorghums. All studies will include economic and biological comparisons to insecticide intensive management programs.



Wildlife Values of Sustainable Agriculture Practices in the Northern Great Plains

Final Report

Project Coordinator:

Ned H. Euliss, Jr.
(previously Douglas H. Johnson)
Northern Prairie Science Center
8711 37th St. S.E.
Jamestown, ND 58401-7317
701-252-5363 Ext. 264
701-252-4217 (fax)

Team Members:

Douglas H. Johnson
John T. Lokemoen
National Biological Service
Northern Prairie Science Center

John Gardner
Brad Miller
North Dakota State University
Carrington Research
Extension Center

Fred Kirschenmann
Northern Plains
Sustainable Agriculture Society

Lyle Samson
Manitoba-North Dakota
Zero Tillage Farmers' Association

Approximately 60 Farmers

Funding:
ACE: \$57,000

Duration:
September 1993 - August 1996

Objectives are: 1) To estimate and compare species richness and density of breeding, migrating, and wintering birds using sustainable agricultural cropping systems and conventional systems; 2) To determine if the three farming systems differ in soil characteristics that might be critical to the overall functioning of the agroecosystem, especially as it relates to wildlife populations; and 3) To inform private and governmental farmland operators of management practices that both benefit land use and enhance wildlife populations. In this study we compared bird use and soil quality among three cropping systems (organic – no synthetic chemicals used, minimum-till/reduced tillage – used between harvest and seeding, and conventional – tillage and synthetic chemicals used annually).

Data were collected for three major cropland types, including wheat for small grain, sunflower for row crop, and fallow for unseeded. Biologists from the Northern Prairie Wildlife Research Center (since renamed Northern Prairie Science Center) determined population density and diversity of breeding, wintering, and migrating birds using the three cropping systems. Population density and variety were enhanced on minimum-tillage and organic farms compared to conventional farming systems. However, nest success was low on all three farm types. All study fields were searched to locate nests and to determine breeding effort and success. Scientists from the Carrington Research Extension Center characterized soil quality by measuring physical, chemical, and biological properties. The Northern Plains Sustainable Agriculture Society and the Manitoba-North Dakota Zero Tillage Farmers' Association collaborated in developing study plans, selecting study cooperators, and specifying data priorities. Cooperating landowners provided study sites and information on chemical and physical inputs, crop yields, type of equipment used, and data for calculating soil erosion losses.



Further Development of Innovative and Practical Education in Sustainable Agriculture in Ohio

Annual Report

Project Coordinator:

Clive A. Edwards
Sustainable Agriculture Program
Ohio State University (OSU)
1735 Neil Ave.
Columbus, OH 43210
614-292-3786
614-292-2180 (fax)

Team Members:

Jeff Dickinson
Stratford Ecological Center

Jack (deceased) and Louise Warner
Stratford Ecological Center

Sean McGovern
Ohio Ecological Food
and Farm Association (OEFFA)

Ted and Molly Bartlett
Silver Creek Farm

Ken and Lyn Chapis
Beam Road Berry Farm

Anu Rangarajan
Michigan State University

Ed Zaborski
McGill University

OSU:
Mike Anderson
Ohio Department of Ag (ODA)
OEFFA

Bill Shuster
ODA

Steve Baertsche
Assistant Director
Extension

Mike Hogan
Mark Bennett
Co-Coordiators
Sustainable Agriculture Team

Mike Cote
Department of Ag Education

Funding:

SARE: \$98,094

Duration:

June 1994 - September 1996

Objectives include: 1) To provide innovative opportunities for practical education in sustainable agricultural for agricultural students and young farmers; 2) To provide and expand venues for sustainable agriculture educational opportunities for practical hands-on experience for agricultural students and farmers through developing a network of publicly and privately operated demonstration farms; and 3) To facilitate the further development of an association of Innovative Farmers of Ohio (IFO) to serve as a highly visible tool for student and farmer education in the promotion of sustainable agricultural practices.

We have made major progress in the first year towards achieving the objectives. During 1994 and 1995 we completed two more 10-week Sustainable Agriculture Internship Programs. We also expanded our program to provide for more one-on-one training during the spring and fall, starting during the fall 1994. These interns followed a demanding schedule, which included developing practical skills through hands-on experiences on demonstration and privately owned farms. They participated in lectures and discussions dealing with a wide variety of topics, including soil ecology, agroecology, rural sociology, Amish agriculture, on-farm research methodology, cover cropping and other sustainable agricultural practices. Each intern also completed projects in sustainable agriculture in topics related to their own interests.

Secondly, we have been working to involve a greater number of farmers and other public and private demonstration farms to establish a network of demonstration farms. A number of field days, demonstrations, workshops and farm tours occurred on these farms over the last year with combined attendance approaching 1,000 people, in addition to serving as venues for practical education with the Sustainable Agriculture Internship Program. This network served as a basis for the formation of IFO, an organization run by Ohio farmers which provides a network exchange of information and ideas, promotes on-farm research to enhance sustainability and profitability, and promotes interaction between farmers, non-farmers, and rural communities. This organization already has over 350 individuals on a mailing list which receives announcements and research trials results on a regular basis, including over 100 paid members. In addition to the ODA/OSU Demonstration Farm at Reynoldsburg, and the demonstration farm developed by Stratford, we have conducted six additional on-farm research trials on three different farms throughout Ohio.



Development and Evaluation of Bio-Cultural Weed Management Systems for Low-Till Grain Production

Annual Report

Project Coordinator:

John Cardina
Department of Horticulture
and Crop Science
Ohio State University (OSU)
1680 Madison Ave.
Wooster, OH 44691
216-263-3644
216-263-3887 (fax)
cardina.2@osu.edu

Team Members:

OSU:
Tom Noyes
Extension Agent

Ed Zaborski
Research Associate
Department of Entomology

Bert Bishop
Senior Statistician

FARMERS:
Jeff Kauffman

Charlie Eselgroth
President
Innovative Farmers of Ohio

Steve Gerber

Bob Slicker

David Weinman

David Andersen

L. Lloyd.

Marcus Ladrach

Funding:
ACE: \$58,183

Duration:
October 1994 - September 1996

Integrated management strategies, including cover crops, mechanical cultivation, and alternative herbicide technologies were used to reduce residual herbicide and fertilizer inputs for no-till corn and soybean production. A hairy vetch cover crop contributed significant nitrogen, provided soil cover, reduced surface water runoff and soil erosion, and gave early season weed suppression in corn. Weed pressure in soybeans was reduced by a winter wheat cover crop. A no-till cultivator, designed to operate under the high residue no-till soil conditions, provided good weed control, particularly when used in conjunction with banded and reduced-rate herbicide applications. With these approaches we were able to reduce herbicide use without resorting to tillage practices that make soil vulnerable to erosion.

Grower cooperators identified the goal of reducing or eliminating high-rate residual herbicides as an environmental as well as an economic decision. Water quality and herbicide drift were important reasons for altering weed control practices. Experiments on three farms helped identify ways to meet these goals, mostly by alternative crop rotations and alternative herbicide use patterns. A field day, attended by about 50 growers, addressed environmental and economic trade-offs associated with alternative management strategies, and ways to integrate approaches like cover crops into rotation systems for the sake of reducing herbicide and monetary inputs.



Evaluating Soil Organic Matter and Soil Biology for Improving Short- and Long-Term Management of Soil Nitrogen Supplying Capacity

Proposal

Project Coordinator:

Edmond Zaborski
Ohio State University (OSU)
Department of Entomology
Ohio Agriculture Research
and Development Center (OARDC)
Wooster, OH 44691
216-263-3724
216-263-3686 (fax)

Team Members:

Innovative Farmers of Ohio

B. R. Stinner
Associate Professor
Department of Agronomy
and Entomology
OARDC
OSU

D. A. McCartney
Research Associate
Department of Entomology
OARDC
OSU

M. M. Wander
Post-Doctoral Research Associate
Laboratory for Sustainable
Agroecosystem Studies
Crop and Soil Science Department
University of Georgia

Funding:
SARE: \$93,500

Duration:
October 1994 - September 1996

This proposal requests SARE program funding to investigate the relationship between soil management practices, soil organic matter (SOM) characteristics and dynamics, soil biology and soil nitrogen (N) fertility. Our project is a collaborative effort between members of a grass roots farmers organization, Innovative Farmers of Ohio (IFO), and the Ohio State University. The collaborating farmers are participating in the identification, development and testing of innovative technologies and management strategies that optimize and reduce N fertilizer inputs. Their approach is to evaluate and use on-farm N resources more efficiently, and base the use of purchased N inputs on more complete information about SOM and its relationship to soil biology and soil N supplying capability.

This research will generate a better understanding of the biological basis for N fertility (both short- and long-term) present in all soils, and explore methods to evaluate and manage this fertility. Specifically, the three objectives of this project are: 1) Demonstrate the degree to which particulate organic matter is affected by management alternatives, including tillage and cultivation, cover cropping, animal manuring, and crop rotation; 2) Evaluate relationships between POM and soil biological activity; and 3) Relate POM quality and dynamics to N dynamics and availability, and evaluate the utility of POM measurements in predicting soil N availability for crop uptake.

Our approach represents a synthesis of practical on-farm, farmer-led research and basic ecological and agronomic lab and field research, and is guided by members of IFO and OSU researchers jointly identifying objectives and practical alternatives for investigation, and evaluating and applying the results in a broader farming system context. The results of this research will have practical implications in the short term for using on-farm and purchased N inputs more efficiently and, in the long term, for managing the soil's inherent N supplying capacity. Results will be shared through IFO field days, farmer-to-farmer workshops and newsletters, as well as through popular and refereed publications. The project's outcome will be evaluated in terms of the participating farmers' ability to reduce fertilizer N costs through better evaluation, utilization and management of on-farm N resources.



The Role of Soil Management in Crop Nutritional Quality and Susceptibility to Pests

Proposal

Project Coordinator:

Larry Phelan
Ohio Agricultural Research
and Development Center (OARDC)
Ohio State University (OSU)
Department of Entomology
1680 Madison Ave.
Wooster, OH 44691
216-263-3728
216-263-3686 (fax)

Team Members:

K. Norris
USDA
NIR Systems, Inc.

OSU:

J. G. Streeter
Professor
Department of Agronomy

J. W. Johnson
Professor
Department of Agronomy

H. A. Hoitink
Professor
Department of Plant Pathology

W. P. Weiss
Associate Professor
Department of Dairy Science

J. F. Mason
Research Associate
Department of Entomology

J. W. Busch
Graduate Research Associate
Department of Entomology

FARMERS:

Besancons
Hartzlers
Millers
Sprays
Browns
Klines
Yoders

Funding:
SARE: \$95,232

Duration:
October 1994 - September 1996

Proponents of organic farming have long contended that their methods of soil management lead to healthy crops with higher nutritional value and greater resistance to insects and disease than crops grown using high-chemical fertility. These reports have been largely anecdotal, but recent studies support the idea of lower pest susceptibility in organic crops. The effects of different soil-management systems on crop nutritional quality remain largely unexplored. Although mineral nutrients are recognized to play an essential role in plant health, it is usually measured by plant yield. When soil-fertility recommendations are based on avoiding nutrient deficiencies that limit yield, there is strong incentive to apply more fertilizer than necessary since the only perceived trade-off is cost of fertilizer. The primary objective of the proposed research is to establish a more holistic view of soil management, requiring an expanded concept of plant health, "inclusive plant health," which includes nutritional quality and resistance to insects and disease. To understand the interaction of soil management and inclusive plant health, we shall use on-farm research and controlled greenhouse experimentation. Initial whole-farm and greenhouse studies will demonstrate how nutritional quality and pest susceptibility differ between crops grown under organic and conventional management, while subsequent empirical studies will help to establish the mechanisms underlying this interaction. The project represents a collaboration between an interdisciplinary team of researchers and farmers who use different fertility management practices. Farmers will provide soil for greenhouse experiments, will provide records of fertility and pesticide inputs, and will allow surveys of pests on their farm. In addition, they will provide experiential knowledge for management variables to be tested and will act as scouts for pest outbreaks in fields other than those being surveyed.

In the broad sense, the work should: 1) contribute to reintegrating production systems, with a systems view of soil management and inclusive plant health; and 2) provide an economic incentive for adopting LISA practices through a reduced need for pesticide. More specifically, we expect the work to lead to: 1) reduced dependence on pesticide; 2) reduced use of inorganic fertilizers and increased use of plant/animal manures; 3) easier transition to LISA with regard to pests; 4) lower off-farm purchased inputs; and 5) potentially improved crop nutritional value and herd health. By both comparing organic and chemical fertility management and measuring the effects of mineral-nutrient balance, the proposed work will benefit the full spectrum of American farmers.

Findings will be disseminated through statewide farmer organizations and publications of the OSU Sustainable Ag Program. Results will also be used to assist farmers in conducting their own experiments. In so doing, farmers will become part of our outreach program, as their experiences increase the interest and confidence of other farmers in changing their soil management.



Economic and Ecological Analyses of Farms and their Component Practices to Promote Diversification through Crop Rotation and Cover Crop Systems

Annual Report

Project Coordinator:

Benjamin R. Stinner
Ohio State University (OSU)
Ohio Agricultural Research
and Development Center (OARDC)
1680 Madison Ave.
Wooster, OH 44691
216-263-3737
216-263-3686 (fax)

Team Members:

OSU OARDC:
Deborah Stinner
Anusuya Rangarajan
Edmund Zaborski
Robin Tavior
Harold Keener
Dave Ellwell
Robert Agunga

OSU EXTENSION:

Alan Sundermeier
Mardy Townsend
Mark Bennett
Mike Hogan

OTHER:

Michael Cote,
Agricultural Education
John Ikerd,
University of Missouri
Valerie Wheeler,
University of California-Sacramento
Peter Esainko,
University of California-Sacramento
Ed Martsoff,
A Whole Better Way
Jeff Dickenson,
Stratford Ecological Center
Doug Pauly,
NRCS

FARMERS:

Richard Bennett
Doug Billman
Charles Eselgroth
Herman Beck-Chenoweth
and Linda Lee
Joe Logan
Richard Wellert

Funding:

SARE: \$117,670

Duration:

October 1994 - September 1996

The stated objectives of this research project were: 1) Develop a participatory on-farm research program to promote diversification through crop rotations and cover cropping; 2) Conduct whole-farm ecological and economic analyses that combine scientific information and farmers' experience to provide the context for component research. Integrate scientific information and farmers' experiences in a whole-farm research study; and 3) Facilitate farmer-to-farmer information exchange focusing on principles of economic sustainability and environmental conservation.

In conjunction with the newly organized farmers' research and education association, the Innovative Farmers of Ohio, we have begun on-farm component research targeted at sustainable farming practices. To establish context and for designing and interpreting component research results, a whole-farm system approach was used. This approach included an analysis of farmers' goals and knowledge, whole-farm nutrient cycles, farm cropping and rotation history, and basic farm economics. We started our research by conducting several in-depth interviews with each farm family to document their experiences, aspirations and farm-related problems. We then developed farm nutrient budgets, which integrated all of the practices on the farm, and helped farmers understand the nutrient cycles that result from the inputs and outputs of their own operations. We have linked our activities in whole-farm planning and analyses to various other state and regional efforts which are currently underway. We have facilitated information exchange through field days, workshops, newsletters and focus sessions, and farmer-to-farmer mentoring.



Integrating Quality of Life, Economic, and Environmental Issues: Agroecosystem Analysis of Amish Farming

Proposal

Project Coordinators:

Deborah Stinner and Richard Moore
Ohio State University (OSU)
Ohio Agriculture Research
and Development Center (OARDC)
Wooster, OH 44691
216-263-3610
216-263-3686 (fax)

Team Members:

AMISH FARMERS:
David Kline Family

Leroy Kuhns Family

Hershberger Family

OTHER:

Fred Hitzhusen
Professor
Resource Economics
Department of Agricultural
Economics and Rural Sociology
OSU

Ben Stinner
Department of Entomology
OARDC
OSU

Funding:
SARE: \$40,800

Duration:
September 1995 - August 1997

The Old Order Amish are one model of agricultural and social sustainability that we believe we can learn a great deal from about fundamental principles of sustainability as we search for ways of building a more sustainable agriculture and society. Our intent is to use data generated to help our target audience (farm families, agricultural scientists and other academicians, students, civic leaders and consumers): 1) see that more holistic and sustainable world views than ours can make good economic sense for farm families and rural communities and produce a high quality of life; 2) stimulate examination and discussion of principles of sustainability; and 3) encourage people to think about how to apply these principles on their farms and in their own communities. The Amish instinctively balance and integrate quality of life, economic, and environmental goals, and this study will give us the opportunity to examine how they do this. In our experience, discussions on the Amish help people begin thinking outside of the limitations of the dominant world view, a major barrier to a more sustainable agriculture and society for the larger culture. The more in-depth quantitative work on Amish agriculture and community proposed here will strengthen and sharpen this dialogue and stimulate more people involved in sustainable agriculture to think about and develop their own alternatives.

Specifically, our objectives are to: 1) determine quality of life and community values for three case study Amish families; 2) analyze the economic efficiency of Amish agriculture with particular emphasis on quantifying the economic benefits of community; 3) develop whole-farm nutrient budgets of case study Amish farms to evaluate nutrient cycling efficiency of Amish agriculture; and 4) facilitate discussion on how what we learn from the Amish can help mainstream farm families become more sustainable. Three Amish families in Holmes County, Ohio, have agreed to work with us on this project. They will not only provide information and access to their farms for field sampling, but also contribute conceptually. We will use Holistic Resource Management to address the first objective. For objective 2, we will use FINPAK, Planetor, Holistic Resource Management financial planning and qualitative aspects of the Wisconsin Whole-Farm Economic Model. Additional anthropological information about Amish agriculture will be collected under objective 2 under the direction of Richard Moore. Using Planetor will help us directly link our economic and environmental objectives. For the nutrient budgets we will use a spreadsheet model developed at Pennsylvania State University that will allow us to calculate individual field, livestock and whole-farm nutrient balances for N, P, K and Ca. We expect to find that the Amish are doing well economically, which should lead to stimulating discussions on fundamental issues of sustainability. Results of the nutrient studies should be very interesting also, as the farms we will be working on have a much longer history (40 -75 years) of sustainable management of any farm we have studied.



Biological Control of Foliar Diseases and Fruit Rots of Tomato

Proposal

Project Coordinator:

Sally Miller
Ohio State University (OSU)
Department of Plant Pathology
1680 Madison Ave.
Wooster, OH 44691
330-263-3678
330-263-3841 (fax)
miller.769@osu.edu

Team Members:

OSU:

Harry Hoitink
Professor
Department of Plant Pathology

Mardy Townsend
Extension Specialist
Agricultural and Natural Resources

Alexandra Stone
Graduate Student
Environmental Science Program

FARMERS:

John Hirzel
Hirzel Farms

Judy and Don Starr
Nancy and Scott Carlson
Starr Farm

Mick and Linda Natco
Little Pond Farm

Funding:

SARE: \$103,580

Duration:

September 1996 - August 1998

Foliar and fruit diseases, especially early and late blight, septoria, anthracnose, bacterial spot, and bacterial canker severely curtail tomato production in Ohio and other Midwestern states. Fungicides are widely used to control these diseases but are not always effective. Additional control procedures must be developed to reduce fungicide use as well as production losses directly attributable to these diseases. Fungicide use in the ornamentals industry has been reduced significantly by incorporation of composts into container media, and compost-induced suppression of diseases in field-grown crops has been reported. Composts have been shown to induce a natural resistance, known as Systemic Acquired Resistance (SAR), in plants to a wide variety of diseases.

The objectives of this project are to: 1) develop consistently high quality, disease suppressive, SAR-inducing composts using farm and local wastes; 2) develop a compost-amended potting mix consistently inducing SAR in tomato transplants; and 3) assess the ability of selected composts in comparative farming systems to reduce foliar and fruit diseases of tomato. Composts will be prepared from cow manure and crop residues/cannery wastes and tested for their ability to induce SAR. Biocontrol agent-fortified, compost-amended planting mixes will be developed for seedling production and tested for SAR-inducing capacity using a tomato/bacterial spot bioassay system. Finally, highly effective compost(s) identified in the study and compost steepages will be compared with non-amended treatments and fungicides (conventional only) in conventional and organic tomato production systems for the presence of foliar and fruit disease.

We expect to identify composts that induce SAR in tomato seedlings and field grown plants, thus contributing to their natural defense against a wide range of plant pathogens. We will develop procedures for use of these materials on organic and conventional tomato farms and communicate this methodology to farmers through educational programs carried out at the state, county and individual group levels. This project strongly addresses the NCR SARE priority area of Environmentally Sound Practices by actively searching for ways to utilize the plant's natural resistance to pathogens (SAR), reduce the problem of organic waste disposal, and reduce the use of fungicides in tomato production.



Impacts of Agricultural Management Systems on Economic, Environmental, and Wildlife Values of Altered and Unaltered Wetland Areas

Final Report
(see also page 78)

Project Coordinator:
Diane Rickerl
South Dakota
State University (SDSU)
NPB 247-B Box 2140C
Brookings, SD 57007
605-688-5541
605-688-4452 (fax)
rickerld@ur.sdstate.edu

Team Members:
SDSU:
Yunian Huang
Ph.D. Candidate
Plant Science Department

Daniel E. Hubbard
Assistant Professor
Wildlife Management

Larry Janssen
Professor
Agricultural Economics

Bruce H. Bleakley
Assistant Professor
Soil Microbiology

FARMERS:
Chris and Laurie Johnke

Charlie and Betty Johnson

Ton and Joan Wolles

OTHER:
Kristi K. Lewis
District Manager
Minnehaha Conservation District

Funding:
ACE: \$100,000

Duration:
October 1994 - March 1997

In the Prairie Pothole Region of eastern South Dakota, wetlands are an integral part of the agricultural landscape. Our multidisciplinary research project investigated wildlife, water quantity/quality, economic, and agronomic interactions between farm management systems and wetlands. A model farm was developed in order to generalize results from the case study farms to more widespread applications. The case study farms included organic (ORG), transitional no-till (TNT) and conventional (CON) management systems on similar soil types. Wetlands classified as semipermanent, seasonal, and temporary were located on each case study farm. All farm fields were surveyed for selected avian and invertebrate abundance and richness. Twelve selected wetland and adjacent upland sites were instrumented and monitored for water quantity/quality studies. On-farm interviews and detailed field measurement were conducted 1992-1995 to obtain information about each system.

Effects of the three management systems on waterfowl, wetland and upland breeding birds, and wetland invertebrates were difficult to demonstrate. Waterfowl breeding pair species richness was highest in the ORG system in all years. Other differences were relatively minor and can be ascribed to habitat factors. Water budgets indicated that approximately 60 percent of the wetland water input was runoff from adjacent fields and thus a potential for wetland pollution from agricultural management existed. Of the total wetland water budget, wetland storage and recharge to soil moisture or groundwater was nearly 40 percent. Nitrate concentrations were less in wetland surface water than the discharging groundwater, and were influenced by wetland classification. Seasonal wetlands were more efficient at removing nitrates than semipermanent wetlands. Groundwater samples from wells near the wetland margin contained higher concentrations of ortho-phosphate than groundwater sampled at upland sites. Soil microbiological assays indicated that denitrification values and populations of sulfate reducing bacteria were higher for lowlands than adjacent upland areas. Wetlands are frequently cited as nutrient filters for surface and groundwater. Although this function helps reduce contamination, it represents a loss of nutrients from the agricultural system.

Yield measurements collected as a base for economic comparisons established zones of increasing grain yield progressing outward from the wetland. The relative ranking of net returns by management system was consistently TNT > CON > ORG, unless organic premiums were a major component of gross cash receipts. Overall, the major differences in net returns per crop acre were attributed to differences in reported average yields, production costs per acre, crop mix, organic premiums, and amount of wetlands in each farming system. Managing agricultural fields with wetlands can challenge both economic and environmental goals. A major conclusion is that all three systems are profitable and can be managed in an environmentally sound manner.



Economic and Environmental Implications of 1990 Farm Bill Sustainability Provisions in Water Quality Sensitive Areas

Final Report

Project Coordinator:

Thomas L. Dobbs
Professor of Agricultural Economics
South Dakota
State University (SDSU)
Brookings, SD 57007-0895
605-688-4874
605-688-6386 (fax)
ec32@sdsu.sdsu.edu

Team Members:

SDSU:

John H. Bischoff
Assistant Professor
Agricultural Engineering
Water Resources Institute

Burton Pflueger
Professor
Extension Farm Financial
Management Specialist
Department of Economics

Lon Henning
Research Assistant
Economics

Charles H. Ullery
Professor
Extension Water Resources Specialist
Agricultural Engineering Department

OTHER:

David Buland
Formerly State Economist
NRCS

Five Farmers
Big Sioux Aquifer

Funding:
SARE: \$82,650

Duration:
September 1993 - August 1996

The overall goal of the research conducted under this project has been to determine whether economic incentives offered by three environmental provisions which were part of, or introduced at about the time of, the 1990 Farm Bill are sufficient to induce farmers in environmentally sensitive areas to adopt sustainable practices and systems. The three provisions were: 1) the Integrated Crop Management (ICM) cost-share program; 2) the Water Quality Incentive Program (WQIP); and 3) the Integrated Farm Management (IFM) program.

The study area consists of nearly 100,000 acres and over 400 farms in three eastern South Dakota counties over the Big Sioux Aquifer; this is a USDA-designated Water Quality Demonstration Project Area where groundwater quality is a critical concern. Five case farms in the study area were selected for analysis purposes – one that has participated in the IFM program and four that have participated in either the ICM program or the WQIP. Crop enterprise and rotation budgets were developed for each of the five case farms. For the two ICM and the two WQIP cases, farming system profits were estimated before and after program participation. Nitrate leaching estimates were also made for the before and after scenarios. Additional possible *practice* and *system* changes were identified for each of the four farms, and both farm profitability and nitrate leaching estimates were made for each of those scenarios as well. Estimates were made for typical, wet, and dry climate conditions.

Results indicated that changes in at least some farming practices and systems could yield both increased farm profits and improved groundwater quality. In three of four case farm studies, changes in farmers' practices associated with ICM or WQIP participation lead to increased profits (ranging from \$6 to \$30 per acre) and very little change in nitrate leaching to groundwater. For all four case farms, there appears to be at least one additional practice or system change that could lead to increased profits and decreased nitrate leaching to groundwater. Some practice or system changes would involve tradeoffs between farm profits and groundwater quality, however. In those cases, difficult policy choices may be necessary where deterioration in water quality becomes critical.

The results of this research help to illuminate the possible magnitudes of the tradeoffs. Considering the *profitability*, *capital intensity*, *complexity*, and *risk* associated with the environmental initiatives examined in this study and with the practices and systems farmers are being encouraged to adopt, we conclude that: 1) operators of large-, medium-, and small-sized farms may adopt several of the practice changes being promoted through WQIP and ICM; and 2) system changes under consideration are more likely to be adopted by operators of medium-sized farms than by operators of small or large farms.



The Effect of Spring-Seeded Annual Medic on Weed Management and Soil Quality in Corn Production

Annual Report

Project Coordinator:

S.A. Clay
South Dakota
State University (SDSU)
Plant Science Department, 2140-C
Brookings, SD 57007-2141
605-688-4757
605-688-4452 (fax)

Team Members:

SDSU:
D.E. Clay
Associate Professor
Soil Biogeochemistry

H. Smeltekop
Research Assistant

L. Wrage
Professor
Weed Science

OTHER:
R.J. Vos
Associate Professor
Agriculture
Dordt College

J. Schiefen
Farmer

D. Postma
Farmer

Practical Farmers of Iowa

Funding:

SARE: \$73,000

Duration:

September 1995 - August 1997

Agrichemicals have the potential to pollute surface and groundwater in environmentally sensitive areas. Management systems that incorporate smother crops to control weeds and/or supply nutrients to the soil may reduce the amount of agrichemicals transported from agricultural fields to nontarget areas. Alternative management systems will only be adopted if productivity can be maintained, they are economically feasible, and the alternative systems are compatible with current management systems. The objective of this project is to determine the impact of annual medic on weed suppression, corn production, and soil quality.

Small plot research trials and farmer demonstration plots were conducted in 1996. The replicated field experiment treatments were a weed and medic free check, unfertilized check, two planting dates, two medic species, and several medic rates. Preemergence and post emergence herbicides were not applied. Nitrogen fertilizer was applied at recommended rates.

Corn yields in the weed free and low and medium medic planting rate treatments were similar. At the high medic application rate, corn yields were reduced by medic. In the on-farm research demonstration study, corn yields were similar when medic and herbicides were used to control weeds. Medic may have reduced weed populations through competition for available nutrients and water or through allelopathy. Laboratory studies suggest that both of these mechanisms occur.



Agricultural Wetland Management

Proposal
(see also page 75)

Project Coordinator:

D. H. Rickerl
South Dakota State University
Plant Science Department
NPB 247, Box 2140 C
Brookings, SD 57007-2141
605-688-5541
605-688-4452 (fax)

Team Members:

U.S. Fish and Wildlife Service

Natural Resource
Conservation Service

Farmer Cooperatives

Funding:
ACE: \$65,000

Duration:
September 1996 - August 1998

Sustaining agricultural and wetland ecosystems means the enhancement of wildlife populations and habitat, the improvement of surface and ground-water quality, and the simultaneous maintenance of profitability and rural vitality. The goal of this project is to increase understanding and awareness of wetland management in the sustainability of agriculture in the Prairie Pothole Region. Specific objectives are: 1) Select sites for wetland management; 2) Develop and utilize the sites for demonstration and data collection; and 3) Evaluate the project from social, economic, agronomic, and environmental perspectives.

Data from an ACE research project indicate that farming through or adjacent to wetlands can result in negative net returns and nutrient overloading. We propose to develop demonstration sites in conjunction with data sites which compare buffered and non-buffered seasonal wetland management in fields. It is our hypotheses that the buffer will: improve productivity and profit by replacing low row-crop yields with productive forage and/or hay crops; improve water quality by cycling nutrients in the buffer rather than the wetland; maintain wildlife habitat; and provide wetland management suited to diverse farming systems in the PPR. The perspective of this study is that wetlands should be buffered rather than act as buffers.

The rationale for developing educational materials and demonstration sites is simple. The knowledge we have gained from past research will not have an impact on the land unless it is understood and implemented by the landowners. Evaluation of the wetland project will be twofold. 1) Are the wetland management practices accomplishing the desired agronomic, economic, and environmental goals? 2) Who in terms of social and demographic characteristics is it that shows interest in wetland management?

The wetland demonstration and data sites will be established on farm fields. The National Resources Conservation Service has six potential cooperators identified. The buffer strips will be established and managed by the U.S. Fish and Wildlife Service who will also provide estimates of wildlife/habitat value. Data sites will be monitored by South Dakota State University personnel to determine agronomic and environmental impact of the buffer strips (wetland water quality improvements and crop yield/forage production). An economic analyses will compare the effects of buffered and non-buffered wetlands on profitability. The demonstration sites will be used for training sessions for extension, NRCS, and USFWS personnel. A video of the demonstration will be developed by *Ag Today*, a TV program with a multi-state audience. A farmers' field day and SDSU class field trips are planned. Surveys and interviews will be conducted to develop a character profile of landowners likely to adopt wetland management practice so we can target future audiences.



Restoration of Economic and Ecological Sustainability in Western Rangeland: A Handbook

Proposal

Project Coordinator:

W. Carter Johnson
South Dakota
State University (SDSU)
Department of Horticulture,
Forestry, Landscape and Parks
Northern Plains Biostress Lab 201
Box 2140-A
Brookings, SD 57007
605-688-5136
605-688-4452 (fax)
Johnsonc@mg.sdstate.edu

Team Members:

SDSU:

Susan Boettcher
Department of Horticulture,
Forestry, Landscape and Parks

Scott Kronberg
Department of Animal
and Range Sciences

Robert Gartner
West River Research
and Extension Center

Scott Fausti
Department of Economics

RANCHERS:
Todd and Clarence Mortenson

Funding:
SARE: \$62,800

Duration:
September 1996 - August 1998

Early agriculture on western rangeland met with little success and often resulted in serious consequences, including soil erosion, loss of native woodlands and wildlife, and economic ruin. The Mortenson family has been engaged in restoring degraded rangeland on their ranch for over 50 years. Their primary goal has been to return the land to its condition prior to European settlement while maintaining a profitable cattle operation. In recent years, the ranch (now operated by Clarence's son Todd) has served as a model of successful ranching based on a conservation ethic. Many groups have toured the ranch. Newspaper and journal articles and a television documentary on the Mortensons' work have generated cries from persons in South Dakota and other states interested in undertaking restoration efforts.

The overall objective of the proposed project is to compile information and publish a guidebook that can be used to help ranchers restore and maintain healthy and productive rangeland. The guidebook will illustrate step-by-step methods used by the Mortensons, providing suggestions for adapting these techniques to other areas. Promotion of sustainable agricultural practices will be strongly emphasized. Collecting information for a restoration manual will also involve obtaining base line data useful in long-term monitoring of vegetation and soil properties.

Personnel involved in the project include researchers from South Dakota State University who have worked with the Mortensons' to document and promote their restoration and management practices. These include Carter Johnson and Susan Boettcher, ecologists who monitored vegetation change at the ranch. Scott Kronberg and Robert Gartner are range scientists with expertise in sustainable range livestock production systems. Gartner directs SDSU's West River Research and Extension Center and has evaluated the Mortenson rangeland, especially during the past three years. Kronberg and Gartner will oversee those portions of the guidebook dealing with pasture and cattle management. Scott Fausti, an SDSU economist who collaborates frequently on interdisciplinary research teams, will conduct an economic analysis of the results of the environmental restoration. Both Clarence, and son Todd Mortenson will participate in developing and editing the guidebook.

Materials and information to be collected include photographs, interviews, field notes, and field data. When text and illustrations are complete, SDSU's Ag Communications Department will assist with final layout. The guidebook will be published by SDSU. It is planned as a high-quality, color publication in a concise, readily usable format available to users at low-cost. Distribution will take place through SDSU, the South Dakota Stockgrowers Association, and at meetings. A form in the guidebook will solicit comments and suggestions from readers.



Whole-Farm Nutrient and Agricultural Chemical Input Budgeting for Sustainable Farming: Analysis and Demonstration

Final Report

Project Coordinator:

Jeffrey A. Wyman
Department of Entomology
College of Agricultural
and Life Sciences
University of Wisconsin (UWM)
1630 Linden Drive
Madison, WI 53706
608-262-3229
608-262-7743 (fax)
kpschmid@facstaff.wisc.edu

Team Members:

FARMERS:

Mike, Ralph, and William Thull
Lee and Tammy Montgomery
John and Annette Guttman
Larry and Bridget Mundth

UW Extension:

Richard Proost
Nutrient and Pest
Management Program (NPMP)

Karen Talarczyk
NPMP

Laura Ward Good
NPMP

Kevin Shelley
NPMP

UW:

Fred Madison
Department of Soil Science
Wisconsin Geological
and Natural History Survey

Pete Nowak
Department of Rural Sociology
Environmental Resources Center

OTHER:

Bryan Black
AG-TRAC Agronomic
Consulting Service

Shawn Eisch
Centrol

Funding:

ACE: \$85,000

Duration:

September 1991 - August 1994
(Final Report received February 1997)

The nutrient distribution and management patterns on three dairy farms in Wisconsin were intensively studied in 1992. Field-by-field potassium and phosphorus levels vary widely from very low to very high across the farms. On all three farms, more phosphate is entering the farm as feed and fertilizer than is leaving in milk and animals sold. At least four times more potash was imported than was exported from the farms. When field-by-field nutrient management plans were prepared for the farms in 1993 and 1994, however, deficits on alfalfa called for the importation of additional phosphate and potash. The substantial amount of nutrients available from animal manures on the farms was suitable for fertilizing corn, but could not be applied to alfalfa fields at rates sufficient to meet its total phosphate and potash requirements without detrimental effects to the stand.

On-farm nitrogen resources (manure applications, legume residues, and residual nitrate left in the soil profile) were able to supply almost all of the corn nitrogen needs on the farms. As manure supplied most of corn potash and phosphate needs, starter rates for corn were decreased. Even with substantial willingness on their part to make management changes and ready assistance on the part of the researchers, the farmers were not able to follow their nutrient management plans completely. Constraints to following the plans included labor shortages, financial deficits that inhibited fertilizer purchases, problems caused by the weather or unforeseen emergencies, as well as the time it takes to get used to new management strategies.



A Biological Control Network for the Sweet Clover Weevil and Clover Root Curculio

Annual Report

Project Coordinator:

David B. Hogg
Department of Entomology
University of Wisconsin
1630 Linden Drive
Madison, WI 53706
608-262-3227
608-262-3322 (fax)
hogg@mac.wisc.edu

Team Members:

Michael J. Weiss
Department of Entomology
North Dakota State University

Walter A. Goldstein
Michael Fields Agricultural Institute

Sue Retka-Schill
Northern Plains
Sustainable Agriculture Society

FARMERS:

David Podoll

Dan Thomas

Terry Jacobson

Funding:

SARE: \$58,551

ACE: \$35,849

Duration:

September 1993 - August 1996

Overall objectives are: 1) To achieve a significant level of biological control of two related weevil pests, the sweet clover weevil (*Sitona cylindricollis*) and the clover root curculio (*Sitona hispidulus*) in the North Central Region; and 2) To involve farmers in learning how to work with and disseminate the natural enemies to be used as biological control agents. Specific objectives are: 1) Receive parasitoids of *Sitona* from Siberia and Moldova; 2) Raise the parasitoids in laboratory cultures and conduct studies to ascertain their behavior, host range and potential effectiveness as biological control agents; 3) Make controlled parasitoid releases in field cages at selected sites in North Dakota and Wisconsin; 4) Make open field parasitoid releases; and 5) Provide selected farmers with a working knowledge of biological control in the sweet clover - *Sitona* - parasitoids system, including major farmer responsibility for the field cage releases, and encourage long term maintenance of the program through farmer networks.

This project is still in a start-up phase. We have successfully completed Objective 1. Parasitoids were imported in two shipments from Moldova and shipment of material from Siberia and were placed in the U.S. Department of Agriculture Quarantine Laboratory in Newark, Del. Two parasitoid species were collected at each location, with several hundred specimens per species. These are parasitic "wasps" (very small - about one tenth of an inch - and do not sting), and they are known only by their scientific names, *Pygostolus falcatus* (from both Moldova & Siberia), *Microctonus aethiopoides* (from Moldova), and *Perilitus rutilus* (from Siberia). The parasitoids will remain in quarantine, and then they will be transported to entomology laboratories at North Dakota State University and the University of Wisconsin.

We have field-collected adult sweet clover weevils (North Dakota) and clover root curculios (Wisconsin) to serve as host in anticipation of this, and we are in the process of obtaining the necessary permits for receiving the parasitoids out of quarantine. Unfortunately, because the quarantined parasitoids are in the larval stage inside their host weevils, we do not yet know how many parasitoids we will have to work with.



Sustainable Community Values Project – Phase II: Community Supported Agriculture and Quality of Life

Proposal

Project Coordinator:

Verna Kragnes/Rick Hall
Philadelphia Community Farm, Inc.
Box 668
Osceola, WI 54020
715-294-3136
715-294-3136 (fax)

Team Members:

Cynthia Cone
Chair
Anthropology Department
Hamline University

University of Wisconsin (UW):

Larry Swain
Cooperative Extension Specialist
Rural Development Institute

George Stevenson
Assistant Director
Center for Integrated
Agricultural Systems
Agriculture Technology
and Family Farm Institute

Marcy Ostrom
Project Assistant
Ph.D. Candidate

FARMERS:

Dan Guenther
Common Harvest Farm

Jim Bruns and Donna Goodlaxen
Forty Acres and Ewe

Michael Racette and Patty Wright
Spring Hill Community Farm

John and Robin Greenler
Zephyr Farm

OTHER:

Michael Fields Agricultural Institute

Land Stewardship Project

Minnesota Food Association

Funding:
SARE: \$55,000

Duration:
September 1995 - August 1997

Community Supported Agriculture (CSA) is a fast growing movement of farmers and consumers reestablishing partnerships in local communities. By emphasizing land stewardship and community revitalization, CSA offers producers and consumers the potential to exercise a new degree of control over the terms of food production, distribution, and marketing. This study seeks to document the potential for such a strategy to significantly improve the quality of life for both urban and rural people and communities in the Upper Midwest.

The objectives of the Sustainable Community Values Project—Phase II are to: 1) Document the skills, knowledge and support needed by CSA farmers and explore options for how they can be developed; 2) Develop strategies for strengthening shareholder involvement in CSA farms; 3) Explore the relationships evolving among farmers, shareholders, and the land; 4) Describe and evaluate the growth of regional approaches to coalition building and collaboration among CSA farms; 5) Examine the relationship between CSA farms and their local communities. Determine how CSA farms can have a positive impact in such areas as economic development, farmland conservation, and environmental quality; and 6) Strengthen the capacity for farmers, members, and supportive organizations to identify and solve problems related to CSA. Develop a participatory research team, made up of farmers, shareholders and academic researchers, to develop and disseminate practical knowledge on an on-going basis.

This study is farmer-initiated and brings together farmers, scientists, and educators to build upon the first two years of the Sustainable Community Values Project. Phase II will apply the research prototype already developed to a total of 15 farms, fine-tuning earlier research questions, and documenting the changes needed to improve the quality of life for all participants. Utilizing a participatory case study approach, both quantitative and qualitative methods will be used in two clusters of farms around Minneapolis-St. Paul, Minn., and Madison, Wis. The information collected will be disseminated to farmers, educators, and consumers in the form of conferences, field days, study circles, and educational materials. Philadelphia Community Farm will provide project coordination and host a field day; Larry Swain, Rural Development Institute, UW-River Falls will conduct the economic analysis and help disseminate results through the Cooperative Extension Service; Steve Stevenson, Center for Integrated Agricultural Systems, UW-Madison will be the principal investigator for the Madison area; Cynthia Cone, Chair of the Anthropology Department at Hamline University, St. Paul, Minn., is the principal investigator for the Twin Cities area; the Minnesota Food Association, the Land Stewardship Project and Michael Fields Agricultural Institute will assist with the facilitation of the study circles.



Hedgerow Habitat for Enhancing the Impact of Beneficial Insects

Proposal

Project Coordinator:

Daniel Mahr
University of Wisconsin (UWM)
Department of Entomology
Madison, WI 53706
608-262-3228
608-262-3322 (fax)

Team Members:

David Hogg
Professor
Department of Entomology
UWM

Paul Whitaker
Research Assistant
Department of Entomology
UWM

Richard DeWilde
Farmer

Two Other Farmers

Funding:

SARE: \$27,894
ACE: \$32,683

Duration:

October 1994 - September 1996

Hedgerows of flowering plants can greatly increase the activity and effectiveness of natural enemies of pest insects. However, the relative attractiveness of cold-hardy perennials and shrubs to natural enemies is undocumented. Based on the existing literature, plant architecture, and pollination ecology, we will select hardy perennial shrubs and flowering plants which are likely to provide natural enemies with habitat and resources that may be lacking in vegetable cropping systems. Hedgerows containing the most promising of these plants will be established in one field on each of three Wisconsin fresh market vegetable farms.

The impact of natural enemies will be examined on cole crops both adjacent to and isolated from hedgerows. Water pan and pitfall traps will be used to assess the diversity of insects at various distances from the hedgerow plantings into the crop. Hedgerow attractiveness and impact on beneficials will be rated using data collected in cabbage plots with and without hedgerows through field scouting, collection of pests for rearing of parasitoids, and exclusion methods to evaluate the impact of predators and parasitoids on pest populations. Finally, the role of these hedgerows in the overwintering of pest and natural enemy species will be studied by trapping all insects that emerge in the spring inside field cages erected over hedgerows during winter.

Hedgerows and cabbage plots will be established on three fresh market vegetable farms in Wisconsin as a collaborative effort between the farmers and University of Wisconsin entomologists and a graduate student. Insect sampling will primarily be the responsibility of the student, but farmers will assist in operating insect traps. All project participants will contribute their expertise in outreach of project results.

This work will increase our understanding of both the ecology and the potential of natural enemies on Wisconsin's many fresh market vegetable farms. Providing enemies with essential resources and quality habitat should increase the local carrying capacity for beneficial species, and permanently suppress the populations of pests. Cabbage was chosen as a model crop to study because of its broad complexes of pest and beneficial insects, so the results of this study should apply to other vegetable cropping systems as well. Ultimately, adding high quality diversity to the agricultural landscape, in the form of hedgerows of plants that enhance the activity of beneficial insects will lessen dependence on insecticides and increase the profitability and sustainability of fresh market vegetable farms.



Impacts of Intensive Rotational Grazing on Stream Ecology and Water Quality

Annual Report

Project Coordinators:

Daniel J. Undersander/Laura Paine
University of Wisconsin (UW)
Department of Agronomy
1575 Linden Drive
Madison, WI 53706
608-262-6203
608-265-3437 (fax)
lkpaine@facstaff.wisc.edu

Team Members:

Wisconsin Department of Natural
Resources (WDNR):
Jerry Bartelt
Wildlife Ecologist
Bureau of Integrated Science Services

Steven Greb
Water Chemist
Bureau of Integrated Science Services

John Lyons
Fisheries Biologist
Bureau of Integrated Science Services

Dave Vetrano
Fisheries Manager

FARMERS:
Dick Cates
Reed Ludlow
Dan Patenaude
Tim Rehbein
UW Extension Agent

OTHER:
Gary Bubenzer
Biological Systems
Engineering Department
UW

Chris Ribic
Department of Wildlife Ecology
UW

Francis McCauley
Agriculture Instructor
Richland Center
WI High School

Funding:
SARE: \$43,488
ACE: \$40,138

Duration:
September 1995 - August 1997

Riparian areas on livestock farms provide important habitat for wildlife and fish communities and a filter for pollutants, in addition to providing water for livestock. Fencing livestock out of riparian areas can protect these sensitive habitats, but presents logistical problems both for farmers and for regulatory agencies. Intensive Rotational Grazing (IRG) may be a reasonable compromise between continuous grazing and fencing livestock out altogether. This study compares three management options for riparian areas: ungrazed buffer strips, rotational grazing, and continuous grazing, on 19 private farms along trout streams in southwestern Wisconsin. The first year of the 2-3 year study is reported on here. Goals of the study include evaluating aquatic communities and habitat as well as terrestrial plant and animal communities to determine overall ecosystem health, and assessment of forage availability and nutritional quality of pastures to quantify the impact of management options on the farm operation.

Many of the differences in terrestrial and in-stream habitat that we have observed among treatments are due to the fact that the buffer strips are not harvested in any way. Buffer strips had significantly taller and denser vegetation than rotational and continuous pastures. Stream bank stability and in-stream habitat were the best for the buffer strips, but rotational pastures were not significantly different from buffer strips and were superior to continuously grazed pastures.

While adjacent land use appears to have a direct effect on stream habitat, preliminary results suggest that fish and aquatic invertebrate communities tend to respond more to watershed scale differences than to adjacent land use. Some minor differences among treatments were observed. Buffer strips had a healthier cold water fishery — more trout and fewer warm-water fish species. Rotational pastures had habitat conditions similar to grassy buffer strips, but fewer trout. Continuous pastures had poor in-stream habitat quality and poor cold-water fisheries.

Riparian wildlife communities appear to respond to several different factors, depending on the species group. Our results suggest that grazed riparian areas may be more suitable for amphibians and birds than buffer strips, while small mammals were more numerous in buffer strips than in pastures. Continuous and rotational pastures each supported a greater abundance and diversity of amphibians than buffer strips, but differences in amphibian abundance or species composition between continuously and rotationally grazed sites were not apparent.

continued ...



Impacts of Intensive Rotational Grazing on Stream Ecology and Water Quality

continued ...

Greater species diversity of birds was observed in both rotational and continuous pastures than in grassy buffer strips, although absolute numbers of individuals were similar. Grassland bird species occurring in both rotational and continuous pastures included eastern meadowlarks, savannah sparrows, brown-headed cowbirds, killdeer, song sparrows, red-winged blackbirds, and American goldfinches. Species diversity and total abundance were greater adjacent to the stream than in upland counts at the same site. Landscape scale features may have been a factor in the presence or absence of birds at some sites. Sites that were surrounded by open space tended to have more grassland bird species than those that were in more wooded areas.

Buffer strips supported more small mammal species and more individuals than either rotational or continuous pastures. However, most small mammal species undergo wide population fluctuations from year to year. It is unclear whether the differences that we are seeing are a response to our treatments or the result of these fluctuations.

In general, IRG appears to have potential as an alternative to fencing livestock out of riparian areas. These preliminary results suggest that while IRG may not protect riparian areas quite as well as buffer strips, it provides a good compromise between fencing and continuous grazing. As the study progresses, we will work on refining IRG management for riparian areas to enhance its value in protecting these environmentally sensitive areas.



Compost Extracts and the Biological Control of Foliar Plant Disease

Proposal

Project Coordinator:

John H. Andrews
Plant Pathology Department
1630 Linden Drive
University of Wisconsin (UWM)
Madison, WI 53706
608-262-9642
608-263-2626 (fax)

Team Members:

R.F. Harris
Professor
Soil Science Department
UWM

E.V. Nordheim
Statistics and Forestry Departments
UWM

John Hall
President
Michael Fields Agricultural Institute

Bob Willard and Edwin Ela
Ela Orchard

Gourmet's Delight Mushrooms

Terry Mushroom Farms

Funding:

ACE: \$52,162

Duration:

August 1995 - May 1997

Composts have long been known to suppress or control soilborne pathogens. However, evidence from Europe and our program shows that watery compost extracts sprayed onto leaf surfaces can reduce foliar disease. We will further improve the efficacy of such extracts in a model system, i.e., primarily on apple trees for control of the apple scab fungus *Venturia inaequalis*. The scab disease is so serious that apples cannot be grown on a commercial scale under moist temperate climates anywhere in the world without effective control (currently fungicides).

Specific objectives are: 1) to further test and enhance water extracts of a Spent Mushroom Substrate (SMS)-based compost, with and without added microbe antagonists, at a research station and a commercial orchard; 2) to determine the active principle(s) of SMS; and 3) to investigate storage conditions for compost extracts to simplify preparation and maintain efficacy. The approach to testing of extracts will include standard in vitro (*Venturia* spore germination assay) and in vivo (depression of *Venturia* spore production; disease indices) assays, as well as orchard trials developed in ongoing work. The inhibitory principle(s) will be identified by molecular filtration, various chromatographic procedures, and chemical separation. The effect of storage conditions (frozen or freeze-dried) on efficacy of extracts will be quantified in standard *Venturia* inhibition or disease suppression assessments already developed. We will also field-test the extracts for control of white mold of soybean, potato late blight, leaf blight of ginseng, turf diseases, and red pine shoot blight.

The research could provide an alternative to chemical fungicides and, for organic farmers, a nonchemical means to control disease. The utility of compost extracts is not restricted to apple scab and, in theory, they could be used to control many foliar diseases. By publicizing the concept of recycling wastes, the project will advance the sustainable philosophy among city dwellers with gardens as well as among commercial growers. The work is consistent and will promote: 1) provision of scientifically based approaches to nonchemical, nonpolluting, biodynamic practices, specifically with respect to approaches to and explanation for composts as they affect plant pathogens; and 2) methods for animal waste and nutrient management that reflect recognition of agricultural profitability together with ecological and environmental values.

The work will be evaluated and conveyed to the public by: 1) ongoing meetings among the collaborators; 2) presentations to farmers at workshops and meetings; 3) oral and written presentations in the media; and 4) annual reports to the sponsors. Additionally, outreach will be facilitated by contacts between the researchers and the Wisconsin Rural Development Council and contacts obtained through the Michael Fields Agricultural Institute, the orchardist and our other collaborators.



Reduced Chemical Inputs in Alternative Potato Farming Systems

Proposal

Project Coordinator:

Douglas I. Rouse
Plant Pathology Department
1630 Linden Drive
University of Wisconsin (UWM)
Madison, WI 53706
608-262-1395
608-263-2626 (fax)

Team Members:

UNIVERSITY:
Doug Rouse,
Plant Pathology
Kevin Shinnars,
Agricultural Engineering
Rick Muck,
Agricultural Engineering
Keith Kelling,
Soil Science
Dave Hogg,
Entomology
Ann MacGuidwin,
Plant Pathology
Jeff Wyman,
Extension Entomologist
Larry Binning,
Department of Horticulture
Ed Jesse,
Agricultural Economics

FARMERS:

Richard and Bob Siewert
Don Casey
John Kutz
Mel Zech
Ron and Connie Wylosak
Steve Deircks
Richard Huitema
Bob Beggs
Chris Malek
John Sendelbach

OTHER:

Dennis Dornfeld
County Extension Agent

Rick Walgenbach
USDA Dairy Forage Research Center

Funding:

SARE: \$64,800

Duration:

September 1995 - August 1997

More chemical inputs are used for potato production than for any other crop in the North Central United States. Multiple applications of fungicides, insecticides and herbicides are made. In addition, soil fumigation is a common practice. A high level of fertilizers are also applied.

In Wisconsin, dairy farms epitomize the image of sustainable family farming. In truth, such farms are being lost rapidly in part because the family dairy farm has specialized in the production of a single commodity – milk. Crops grown on most dairy farms have primary value only as on-farm inputs for milk production. Corn and forage prices preclude these crops as significant sources of cash receipts. As the price of milk has stagnated and costs have gone up, economic hard times have resulted. A solution for some may be diversification to eliminate total dependence on the milk check. A crop with high cash value that could make use of on farm inputs itself while providing on farm inputs to the dairy subsystem would be ideal. The potato subsystem and the dairy subsystem on a diversified farm have great potential to complement each other.

In a previous project funded by the North Central Region IPM program we reduced pesticide inputs 80-90 percent and nitrogen fertilizer 50 percent (100 pounds N per acre) by utilizing mixed crop-livestock farming systems dispersed away from the concentrated potato production area to avoid key pests. We hypothesize that pests can continue to be managed at levels below economic injury by using several alternative practices that are particularly adapted to mixed crop-livestock systems. In these systems the acreage of potatoes will remain small compared to current potato production systems, resulting in fewer pests. Because pesticides are infrequently used, high populations of natural enemies are present. One dairy farmer we worked with last year netted \$800 per acre on 20 acres of potatoes. The year before that, a farmer we worked with increased milk production 5 pounds per cow per day by feeding cull potatoes in his TMR.

We now want to test the hypothesis that removing potato foliage at the end of the season instead of vine killing with herbicides will reduce inoculum of *Verticillium* (cause of potato early dying) and *Alternaria solani* (cause of early blight). We hypothesize that harvested potato vines and cull potatoes can be made into silage and fed to ruminant livestock in a TMR system. Manure from the livestock system can be used as fertilizer. By using 30-inch row spacing instead of 36-inch spacing we will improve competition of potatoes against weeds and have compatibility with tractors used on corn. Several farmers are anxious to work with us to test these ideas. Two dairy farmers who are near each other have even purchased potato equipment together for \$35,000 and are planning to grow 40 acres each next summer. Some potato growers have also taken a positive interest.



Training and Transitioning New Farmers: A Practical Experiment in Farmer Self-Development and Institutional Re-Invention

Annual Report

Project Coordinator:

George W. Stevenson
Center for Integrated
Agricultural Systems (CIAS)
1450 Linden Drive, Room 146
University of Wisconsin (UW)
Madison, WI 53706
608-262-5202
608-265-3020 (fax)
Stevenson@aae.wisc.edu

Team Members:

GRAZERS:

Charles and Dorothy Opitz
Paul and Cyd Bickford
Mike and Charlotte Cannell
Dan and Shelly Truttman
Bert and Trish Paris
Altfred and Sue Krusenbaum

Wisconsin DATCP:

Jeanne Meier
Gwen Garvey
Ian Forrester

County Extension:

John Cockrell
Larry Tranel
Andy Hager

UW CALS:

Dave Combs,
Department of Dairy Science
Dan Undersander,
Department of Agronomy
Gary Frank,

Center for Dairy Profitability

ATFPI and CIAS Staff:

Rick Klemme
Steve Stevenson
Michelle Gale-Sinex
Fred Buttel
Dick Cates

OTHER:

Alan Henning,
Grazing Consultant
Steve Bauer,

Rural Attorney

Gene Sirian and Bill Rockwell,
Wisconsin Technical College Systems
Joe McNair,
AgriView
Rick Daluge,
Farm and Industry Short Course

Funding:

SARE: \$85,800

Duration:

September 1995 - August 1997

The practical experiment proposed below seeks to address a key dilemma associated with the structure of agriculture throughout the North Central Region: a serious decline over the past several decades in the rate of entry of new farmers (Gale and Henderson, 1991). Farmers leaving the profession greatly outnumber those entering. In Wisconsin, the ensuring loss of farms is particularly rapid in dairying (Cross, 1994). Coupled with an aging farm population and a recent decline in the state's aggregate dairy production, Wisconsin's seeming inability to reproduce its base of farmers presents increasingly serious consequences for the state's dairy manufacturing and processing sectors and for the economies of many rural communities (Barham, 1994).

On the positive side, a serious and sustained movement of dairy farmers in the state is adopting various forms of rotational grazing to address issues of profitability, life style, and environmental stewardship. Over 700 farmers attended Wisconsin's second annual grazing conference, organized by farmer networks around the state (Stevens Point, March 1994). To many knowledgeable observers, low-capital, grass-based dairying appears to offer a significant entry vehicle for beginning farmers. In addition, veteran graziers increasingly speak of a willingness to act as mentors and sponsors for young farmers interested in grass-based dairying.

What appears to be needed is a creative and coordinated effort to couple the resource of these veteran farmers with institutional resources to identify, educate, and strategically transition young families into farming enterprises that are environmentally, economically, and emotionally sustainable. The project proposed seeks to experiment with such a creative, coordinated effort through: investigating (with a strong eye to adapting) some of the programs and institutions of a country (New Zealand) with extensive experience in preparing and placing new dairy farmers; reinventing portions of the Farm and Industry Short Course at the University of Wisconsin-Madison as a "School for Beginning Farmers"; and establishing and monitoring case examples of veteran graziers mentoring and sponsoring the entry of new dairy farm families.

While couched in Wisconsin realities, this practical experiment is intended to be a model and inspiration for farmers and educational institutions in other states as they search for ways to reproduce a viable and vibrant base of farmers. It is fundamentally a demonstration and education project with strong investigative and monitoring components. It links farmer networks, county Extension personnel, and university resources.



Involving Farmers

Critical to sustainable agriculture research and education projects are, of course, farmers and ranchers. We strive to make sure our research is applicable on-farm, combining lab trials with farm experiments and demonstrations. Some projects revolve around producer participation, others are complemented by it. Below are just a few applaudable examples of project coordinators involving producers in their projects. (*State and project number follow each excerpt.*)

The members (farmers) do the planning and evaluation of the plots. Therefore, the project is being designed to address their concerns and the data will be acceptable to them. Innovative Farmer tours have drawn over 200 participants in each of the last three years. Membership has grown from 47 in the first year to 81. One of the first changes noted is that the members are taking a greater interest in the plots this year. During the initial year, they would visit the plots, but look into the plots from the ends of the rows. Now they are in the fields, digging in the soil, and taking a much closer look than in previous years.

MI LNC 94-64

IMPACT involved over 80 group members (producers) from 20 communities in 1996. These members controlled over 50,000 acres of farm and ranch land.

NE LNC 95-81

All the members (producers) of our cooperative have now raised and marketed grass-fed beef through our cooperative and have committed future supply to meet market needs. We have a ninth rancher in the process of joining and investing in cooperative marketing rights.

KS LNC 95-78

An initial effect from the project has been to get producers to recognize the need for production and marketing records. The rancher collaborators are all participating in "Standardized Performance Analysis" (SPA), an economic and production analysis of their ranches to determine their costs per cwt of calf weaned and their production efficiency. A number of other producers outside the collaborators are participating in the analysis. All but one of our collaborating producers have changed their calving date to more closely match the cow with the grazed forage. The driving factor has been to reduce production costs and improve profitability. From communication with our collaborators and other producers we estimate that about 25,000 head of cows have had or will have their calving season changed as a result of this project.

NE LNC 94-74



Innovations and Contributions

Research and Education Projects Inside Information

Believing that farmers are excellent observers of their environment and of the interactions therein, each farmer-collaborator was given a journal in which to record on a daily basis all efforts, thoughts and observations related to his/her on-farm bird use. Instructions were delivered verbally, as well as attached to the front cover of each notebook. Journal entries were read and discussed during each farm visit. The journals provided an opportunity to record in a farmer's own words what was happening 'on the ground' throughout the season.

MI LNC 95-82

The use of photography to record farm/farmer data was not part of the original proposal. It was added, however, as a way to further elicit from farmers their understanding of sustainability and its presence on-farm. Each farm collaborator was given a roll of film and a disposable (recyclable) camera and asked to photograph those aspects of their farming operations that exemplified, or were compatible with, their notion of sustainable agriculture, paying special attention to the role of birds as biological control agents. Farmers, in other words, were asked to frame reality in ways that made sense to them and not necessarily to the researchers.

MI LNC 95-82

Due, in large part, to practicing the ideals of Holistic Management, the project farmers solicit information from specialists and other sources, test changes against their quality of life and landscape goals, and then adapt practices to their management system. Though the preliminary findings listed may provide useful information for land users and resource professionals, we hope that the holistic, goal-based approaches to management employed by project farmers will become an integral process for all team participants in personal, professional, and educational endeavors.

MN LNC 94-75

A number of producers are reporting changes. Our experiences show that farmers like to learn from other farmers and that this can be an effective method to change, but continual efforts are needed to help establish and nurture the mentoring process. The mentor program participated in six major conferences and helped sponsor five workshops where over 900 producers participated.

NE LNC 93-60

The two producers who served as consultants for this project are both outspoken advocates of forage-based beef production. Both have been used to speak to classes at the University of Nebraska-Lincoln. Their involvement in this project has helped reinforce their views.

NE LNC 93-54



Innovations and Contributions

Research and Education Projects Inside Information

Five case study farmers were deeply involved in this project, and another farmer with extensive IFM experience was involved in a consultant-advisor role. The economics newsletters, summarizing economic and environmental findings of the study, directly or indirectly provided information to many farmers.

SD LNC 93-55

Farmer mentors were pleased with the type of education that this project provides. They remarked on the importance of getting into the field and making decisions, as well as getting the feel for what implementation of different systems really means in practice. There was a range in talents among the 1995 (student) interns, and they learned a number of skills from each other as well as from the resident farmer and project coordinators.

NE LNC 94-73



Involving Others

Farm and nonfarm individuals and groups appear in our project reports. We aim to get the most mileage from projects as possible, which includes outreach beyond the farm gate. Extension, businesses, nonprofit groups and others are active participants in our research, education and demonstration. What follows are some inventive ways our project coordinators involve others – and some inventive audiences.

Extension educators play a key role in developing clinics and presenting information as well as assisting in processing samples.

IL ANC 95-29

There are 29 Crop Systems Educators and seven IPM educators who are involved in nematode management within the state. Their role in promoting awareness of nematode problems consists of planning clinics, field days, workshops, etc., and in presenting information to local audiences of farmers, agribusiness concerns, and others interested in nematode management.

IL ANC 95-29

Extension educators are closely associated with several IMPACT groups. These educators have begun to encourage their peers to look at IMPACT as a valuable tool for Extension programming.

NE LNC 95-81

Nonfarm community members participate in several IMPACT groups, including a feed supplier, veterinarian, banker, farm coop manager, and retailer. One IMPACT group works in urban Omaha to teach its members to garden and to sell produce at the farmer's market; all its members are city dwellers. This group sent two representatives to a statewide IMPACT picnic and farm tour that resulted in significant discussions between the city dwellers and farmers trying to direct market their farm-raised meat products. A group raising pastured broiler chickens invites its customers, largely townspeople, to pick up their orders at the farms and to watch the processing on slaughter day.

NE LNC 95-81

In October 1996 we conducted our first "Ranch Day" or customer appreciation event, held on a member's ranch and attended by over 100 people. We introduced guests to our beautiful scenery, ranch life and the philosophy behind our product and cooperative. Participants were very enthusiastic. We served a delicious steak dinner, had prairie tours explaining our unique system of beef production, historical exhibits, and educational speakers.

KS LNC 95-78



Innovations and Contributions

Research and Education Projects Inside Information

We participated in a large outdoor concert at which we had an educational display and producers to visit with city people. Also a concessionaire served our beef and we had by far the longest line of customers. In our promotions, we give cooking demonstrations on how to prepare lean beef and explain to our customers how our beef is different. We conducted other educational sessions for urban audiences; we gave a program on rural economic development through marketing cooperatives, and have just developed a slide show for laypersons which illustrates grass-fed beef production and its inherent conservation of prairie, timber, water and wildlife resources, and the philosophy of direct marketing to preserve family ranches and rural communities.

KS LNC 95-78

Holistic Management professionals from around the country heard about our work and financial evaluation system when they came to Minnesota last August. Over 100 practitioners heard presentations on holistic goals, quality of life, streams, birds, soil quality, how to interpret "profits" and how to use the new system. This influential group seemed very impressed with what they heard and, again, follow-up work is anticipated.

MN LNC 94-75

We have established a partnership with Trees Forever, a private nonprofit organization, to organize and conduct workshops focusing on design and installation of riparian management systems. These workshops are targeted towards resource management and conservation professionals involved in helping landowners diagnose problems and design and/or install riparian management systems.

IA ANC 95-24

We are working with Iowa State University Agronomy Extension to incorporate buffer zone technologies into their curricula and extension efforts. The summer audience of approximately 525 fee paying participants are representatives of fertilizer and chemical dealerships, seed companies, chemical companies, consultants and farm managers.

IA ANC 95-24

Realizing their importance as information sources to farmer/landowners, we are working to increase our exposure to agribusiness personnel through other means. For example, we presented a poster at the Iowa Institute for Cooperatives Annual Meeting and will also make a presentation entitled "Agroforestry Opportunities to Improve Sustainability and Profitability" at the American Farm Bureau Federation's 78th annual convention.

IA ANC 95-24



Innovations and Contributions

Research and Education Projects Inside Information

We are linking up with change efforts within the university through the Minnesota Extension Service and the Visions for Change Project, which is a Kellogg Foundation-funded project for institutional change within land-grant universities. Our administrators have been enthusiastic and supportive of our exploration of a new role for the university.

MN LNC 95-90/ANC 95-26

On July 26, 1996 we gave a whole day seminar on the influence of within-field and landscape complexity on biological control to a group of 20 students from Latin America and Africa. These students were attending an Integrated Pest Management course at Michigan State University. After the class, this group was taken to the field, and the our experiments and techniques were discussed.

MI LNC 95-85

We encouraged both the farmer and spouse to participate in the mentoring process.

NE LNC 93-60

We were invited to make a presentation to the National Cattlemen's Beef Association long-range planning committee on the use of forages and crop residues in beef production. We presented our data and had a good discussion of the sustainability of beef production based on high grain use versus high forage use.

NE LNC 93-54

The Practical Farmers of Iowa/Iowa State University farming systems coordinator facilitated the trials and field days, and a number of county and area Extension personnel either attended or presented at project field days. Also involved at field days were several outlying research farms of ISU, the Natural Resources Conversation Service and the Dordt College Agricultural Stewardship Center.

IA LNC 92-44

It is likely that at least 200 agricultural economists from across the U.S., and some from other countries, saw the poster at the July 1996 American Agricultural Economics Association meetings.

SD LNC 93-55



Focusing on Profit

If it doesn't make money for the producer, it isn't sustainable. Profitability is a high priority in sustainable agriculture concepts and methods. Nearly all of our projects take farm profit into account. Below are some examples of how our project coordinators are attempting to keep farms economically viable.

Our results show that widely spaced alley cropping systems have higher net present values than traditional row cropping of corn, corn-soybean rotations, corn-soybean-wheat-soybean double crop rotations, pure timber plantations, or closely spaced alley cropping systems. Rates of return are on the order of 18 percent. Thus, for those landowners interested in long-term income from timber, both timber and crops can be grown at a handsome profit.

IN LNC 94-72

Preliminary analysis of the two systems through weaning indicates that June calving will reduce harvested and processed feed costs by about \$85 per cow per year or \$94 per weaned calf assuming a 90 percent weaned calf crop. If calves were sold at weaning time June born calves would gross about \$44 per head less (calves priced at \$80 per cwt in fall and \$81 per cwt in January). The net difference of \$50 should more than offset the difference in cost of winter grazing (3 AUMs). In addition labor savings have not been included. We estimate that about three-fourths of an hour of feeding labor alone will be saved by the June system. Diesel fuel use was estimated to be reduced by 4.5 to 5.0 gallons per head per year because of less harvesting of hay and reduced fuel for feeding harvested forages. While these results are preliminary, they are encouraging that the June system may be competitive economically while reducing use of harvested feed, fossil fuel and other purchased inputs.

NE LNC 94-74

Justification by ranchers has been to decrease costs and add flexibility to their production systems. If a producer can realize a net gain of about \$50 per cow annually, as we have observed in this project, producers that have adopted practices in this project will gain about \$1.1 million this year. If these concepts are used by 20 percent of producers in just the Nebraska Sandhills, the savings would be about \$5.5 million.

NE LNC 94-74



Innovations and Contributions

Research and Education Projects Inside Information

The results of this hypothetical comparison indicate that the input costs for using geese are slightly greater than using human labor. The largest costs associated with using the geese are the initial purchase of the birds and the necessary feed. Care of the geese required approximately one half hour of labor per day. However, if it is assumed that the geese can be sold at the end of the season for \$10 per bird, the total weed management cost for the weeder geese system is less than 55 percent of the cost of the system based on human labor.

MI LNC 95-82

Preliminary results indicate that the Monitoring Team farmers are doing a remarkable job of controlling veterinary and herd health expenses without sacrificing yield or herd health. Measured as a percent of gross income, veterinary and herd health expenses are two to three times higher for conventional farms than for these farms.

MN LNC 94-75

The most important part of the economic analysis was the record keeping and final analysis skills learned by the (student) interns. Interns kept close track of all field expenses, management costs, land rental, and other financial data through the entire cropping year to be able to conduct a precise analysis after harvest.

NE LNC 94-73



Sharing Results

The NCR SARE Administrative Council considers outreach a crucial component of a successful project – sustainable agriculture information is widely dispersed and we get more for our money. Our project coordinators use some creative means of communicating their results to a variety of audiences. What follows are just a few of the innovative outreach components in research, education and demonstration projects.

Several Michigan State University Extension Agents have asked an Innovative Farmers representative to conduct presentations to farmers in their counties. As a result, three Innovative Farmers groups have been formed in other areas of the state.

MI LNC 94-64

The MIFFS Project also provided funding for an Innovative Farmers exhibit, which has been used at a number of agricultural trade shows and educational programs.

MI LNC 94-64

The Innovative Farmers Project has been featured in monthly Michigan Farm Bureau news publications; *The Pioneer NewsBeet Magazine*; *The Sugar Beet Grower Magazine*, which is distributed to all beet growers in the United States and Canada; and *The Michigan Natural Resources Magazine*. The IF Project was also featured in reports published by the Coast Alliance and World Wildlife Fund.

MI LNC 94-64

The Innovative Farmers group has affiliated with the Innovative Farmers of Ontario Association and information is shared back and forth.

MI LNC 94-64

We are in the middle of preparing a video of the Swedish-style hog system model on several Swedish farms for distribution to farmers who are inquiring about the system. A video will be helpful to farmers who have not been to Sweden but are trying to visualize the system.

IA LNC 95-80

We are producing a 30-minute slide set summarizing the findings to be used for mobile presentations in area communities, agricultural organizations and extension offices.

NE LNC 94-65



Innovations and Contributions

Research and Education Projects Inside Information

Approximately 35 farmers attended the field day and brought soil samples for free processing for nematodes. As a part of these clinics, a video camera attached to a microscope was used to allow farmers to observe nematode problems in the samples they submitted.

IL ANC 95-29

Two clinics were held at high schools with the assistance of the local agricultural instructor where students were given information on nematode management and assisted in the processing of the samples.

IL ANC 95-29

Morrison Farmers' Supply has assisted area farmers in locating seed supplies for mustard and rapeseed as a cover crop as a result of the Merema study.

IL ANC 95-29

Stories of the IMPACT Project and individual IMPACT groups have been reprinted in newsletters of other organizations around the country.

NE LNC 95-81

Project staff presented the IMPACT design and results at poster sessions of the American Society of Agronomy and the North American meeting of the Association for Farming Systems Research and Extension.

NE LNC 95-81

MFA will be advertising this report for sale at a nominal cost in a variety of publications and on a future web site on the Internet which will be set up before the end of the year. In addition, the executive summary information will be sent to high school educators and guidance counselors and to the technical schools in Minnesota.

MN LNC 94-67

A poster paper was also presented at the American Society of Agronomy Annual Meeting in Indianapolis, Ind., in the Agroforestry Symposium workshop of the Integrated Systems section. In addition to landowners and farmers, these presentations addressed federal, state, and private foresters and NRCS personnel.

IN LNC 94-72

To target the appropriate audience for further extension efforts in Indiana and the region, our research team is planning a State Fair exhibit to disseminate our results.

IN LNC 94-72



Innovations and Contributions

Research and Education Projects Inside Information

We have been involved in communication with: Grassworks, Inc., the umbrella organization of farmer grazing networks in Wisconsin and sponsor of the state's annual conference on grazing; the Wisconsin Department of Development's Dairy 2020 Program; and the 2-year-old Wisconsin Farm Entry/Exit Coalition.

WI LNC 95-88

Eight Iowa State University classes utilized the site of this SARE project, including classes on animal ecology, forestry, geological and atmospheric science and landscape architecture.

IA ANC 95-24

Results from the 1996 field experiment at Madison, Minn., were provided in a poster presentation on Dec. 11, 1996 at the North Central Weed Science Society of America meetings in St. Louis, Mo.

MN LNC 95-90/ANC 95-26

Researchers and farmers contributed to a panel discussion and two farm visits to explain this collaborative research during a Chapter 3 sustainable agriculture training for Extension and NRCS personnel. Researchers and farmers shared their results and observations at the Heartland Roundup.

KS LNC 95-83

The results of the 1996 field work were presented during the Annual Meeting of the Entomological Society of America.

MI LNC 95-85

We have hosted producers associated with a SARE project in Montana. These producers toured our project and the ranches of some of our cooperating producers. Researchers from the University of Wyoming who are beginning a SARE project on calving date have also visited our project at the research ranch near Whitman. We continue our collaboration with the Wyoming and Montana researchers.

NE LNC 94-74

A web page will be developed as part of Michigan State University's Sustainable Agriculture site. The page will include: Introduction to the project; farm profiles with photographs; sustainable agriculture value survey and its summary; philosophy of avian integration; and future research directions.

MI LNC 95-82



Innovations and Contributions

Research and Education Projects Inside Information

The Rupprecht farm and the monitoring project were covered in the October issue of *Successful Farming*. The project was also covered in January-February issue of *The Minnesota Volunteer*. Additionally, the project was featured in other news stories.

MN LNC 94-75

A summary of the project results is on the Nebraska Sustainable Agriculture Society Web page.

NE LNC 93-60

This material has been reported in our annual Beef Cattle Report, in extension meetings, at the Nebraska Cattlemen's meetings, to the Nebraska Sustainable Agricultural Society, at the annual American Society of Animal Science meetings and the American Society of Agronomy meetings. We have had numerous visitors to our research facility to view our results.

NE LNC 93-54

Over the course of this grant, total attendance at PFI farm field days was approximately 6,000. Each field day was promoted in an individualized press release that went to local newspapers and, television and radio stations.

IA LNC 92-44

Eight national and regional formal presentations of findings from this project were presented to policy makers and peers during the past three years. In addition, extensive discussions of project findings were undertaken with government officials, legislative staffers, and nonprofit agency policy analysts in Washington, D.C., in June 1995 and June 1996. Also, Dobbs chaired a symposium session on the prospects for "green (or stewardship) payments" at the August 1994 Annual Meetings of the American Agricultural Economics Association in San Diego.

SD LNC 93-55

Detailed economic and environmental results for each of the four case farms participating in either the ICM program or the WQIP are contained in the South Dakota State University Economics Pamphlet series. Four reports in that series were distributed to Extension specialists working with the Big Sioux Aquifer Demonstration Project and to key personnel in South Dakota offices of the USDA's Natural Resources Conservation Service.

SD LNC 93-55



Innovations and Contributions

Research and Education Projects Inside Information

South Dakota State University is teaming with North Dakota State University on a two-year training project using SARE Chapter 3 funds. Pflueger participated in a series of four workshops (in North and South Dakota) as part of this project in September 1996. His participation in this study of the Big Sioux Aquifer helped prepare him for the economic presentations he made at the four workshops.

SD LNC 93-55

We participated in the Michigan Ag Expo 1995 held at Michigan State University in July. Medics and berseem were planted alone and interplanted with corn in modules for demonstration. Annual medic information sheets were also distributed during this exhibition.

MN LNC 93-58

Videotapes were prepared and copied by October 1995. A set of the videotape series has been distributed to each county extension office in Iowa and the availability of the series for sale at a nominal charge has been announced both in print media and on computer bulletin boards. News releases were sent with each set of tapes to each county extension office. Additional articles on the videotape series are to be printed in the *Iowa Cattleman* and *Wallace's Farmer* magazines as well as the newsletter of the American Forage and Grassland Council. In addition, the availability of the series was announced on the Forage-mg, Graze-L and Beef-L bulletin boards on the internet.

IA LNC 94-71

We have: developed a collection of slides emphasizing sustainable production techniques and methods for further program and presentations development; directly contacted every Extension and 4-H agent in all of Ohio's counties on program announcements, research and outreach activities; and disseminated reports, letters, and announcements via an online server hosted by OSU and OSU Extension.

OH LNC 92-47.1

The project included: assembly of learning objectives, teaching materials, planning documents, samples of journals and farm plans; evaluation formats; and reference to production data on which farm design decisions are made. These will be published in the "green book" series of the Center for Sustainable Agricultural Systems of UNL, along with other resource materials for education and extension of sustainable agriculture.

NE LNC 94-73



Innovations and Contributions

Research and Education Projects Inside Information

We have published a four-color brochure describing the learning objectives and types of field activities that student interns carry out to reach the objectives, with the goal of raising additional support for the project and promoting the eventual institutionalization and self-support of the micro-farm internship program. We have also prepared and distributed materials generated by student interns and used in tours and meetings with other students.

NE LNC 94-73

We will add a section on nonchemical weed control to the Ohio Weed Control Guide.

OH ANC 94-23

FFA students have had the opportunity to participate in field work and demonstration activities coordinated with ongoing research funded by the Leopold Center for Sustainable Agriculture, field projects associated with the Raccoon River Watershed Project, and local extension personnel.

IA LNC 95-84

FFA students have interacted with hundreds of Iowa farmers through research activities, field days, involvement in community projects, and local media coverage. These contacts are expected to continue as more new students become involved in this project. Researchers and chapter advisors will make presentations to agricultural education instructors at a soil testing workshop on June 19 and at the state in-service training workshop on July 12.

IA LNC 95-84

We have put up signs on the participating farms and held field days, including a "freebie" – an inducement to come in addition to the field day itself (e.g. food, free testing of water samples).

WI ANC 91-06



Expanding Knowledge

We ask our project coordinators to tell us possible ways in which their project will contribute to higher profits for producers, environmental protection, and/or community enhancement. Some contributions are broad-reaching, some are site-specific – all are well worth a glance. By identifying ways in which their projects expand sustainable agriculture knowledge, our project coordinators help us see the “big picture” and greater value of each project. Sometimes coordinators find unforeseen contributions, which pave the way for further research in sustainable systems. The examples below help paint a picture of the impact NCR SARE is having throughout our region.

The initial purpose for this project was to reduce wind erosion from unprotected fields. Based on the residue checks, the alternative conservation tillage systems are reducing the soil loss potential by as much as four tons per acre per year. At a value of \$3 to \$6 per ton, that has the potential for saving the farmer \$18 per acre per year (\$4.50 x 4 ton). The \$3 to \$6 figure is based on soil fertility, organic matter and basic soil in a ton.

MI LNC 94-64

One of the major efforts has been to involve the entire community. Through this project, equipment dealers have a better idea of what equipment should be sold to make the systems work. Fertilizer and herbicide suppliers understand how to put the programs together to ensure better results. That is a benefit to the community.

MI LNC 94-64

Also, to this point large capital investments have been eliminated from the picture. Large capital investment is becoming a significant problem for young farmers trying to start a farm operation.

IA LNC 94-66

The use of either spring or fall planted *Brassica* species appears to offer farmers an alternative to the use of pesticides as a means of increasing yields of corn where nematodes are a limiting problem.

IL ANC 95-29

We feel establishment of small marketing cooperatives like ours is possible, and the benefits are: 1) a closer connection to consumers who wish to put a face on the people who produce their food; 2) a closer control of quality; and 3) potentially, we hope, a chance for greater return on our labors.

KS LNC 95-78



Innovations and Contributions

Research and Education Projects Inside Information

We feel we can serve as official “myth busters” against the notion that lean, grass-fed beef is low in quality, i.e. tough and bad-tasting. Yes, it can be those things when proper production methods are not followed or it is overcooked, but produced with correct genetics and with rapid gain on high quality forage the last 60 to 90 days, and cooked correctly, grass-fed beef is as good or better quality than conventional beef, and is much healthier because it is naturally low in fat and cholesterol. We feel the impact of this revelation is far-reaching, and will promote increased free-range, forage-based beef production, resulting in obvious benefits in energy conservation, soil conservation, and water quality enhancement by avoiding the grain production-feedlot model, as well as offering the consumer a much healthier product.

KS LNC 95-78

If land grant institutions are to meet the needs of the people they are supposed to serve and help build healthy communities, they will need to listen more carefully to sustainable farmers, offer courses and programs they need, and reach out to and help prepare the sustainable farmers of tomorrow. The intent and hope of this project is to provide a bridge for that effort.

MN LNC 94-67

Growing these commodities in proximity to each other provides additional benefits such as lower inputs for trees and crops, improved wildlife habitat, the potential for extreme weather buffering, and improved soil tilth.

IN LNC 94-72

One of the farmer's major objectives in cooperating with the project was to establish habitat for wildlife, including improving the in-stream environment for fish. He has seen a dramatic increase in wildlife along the buffer strip and around the constructed wetland. In the severe cold weather and deep snow of late January 1996, he saw over 40 pheasants using the switch grass and shrubs of the buffer strip. He views this as very positive and likes to spend time along the buffer strip walking and fishing with his grandson. He sees this project as a model for improving the quality of life in the rural agricultural landscape.

IA ANC 95-24

The potential contribution of PST for weed control in soybeans is that it may be able to provide a reliable nonchemical weed control for Canada thistle, which is a noxious weed. If PST was approved for organic soybean production, it could become a good weed control option for producers.

MN LNC 95-90/ANC 95-26



Innovations and Contributions

Research and Education Projects Inside Information

The potential contribution from the weed science research cooperative is that we could have significant and lasting impact on the way universities conduct agricultural research. There are many benefits from having a more reciprocal and on-going relationship between land-grant scientists, farmers, agricultural consultants and other interested parties. We want to convene a group that can provide a collaborative response to large-scale weed management issues.

MN LNC 95-90/ANC 95-26

The knowledge obtained from this study will provide the conceptual framework in which farmers will adopt farm-specific solutions to enhance the effectiveness of beneficial insects to control pests. The associated benefit is the reduction of costly off-farm inputs for pest management.

MI LNC 95-85

There are potential benefits if the rate and date of planting can be determined for optimum corn production. If weed control through the use of a smother crop can be accomplished, then agrichemical inputs can be reduced. Spring-seeded annual medics also reduce erosion, improve soil quality, and provide a N credit for following crops.

SD LNC 95-79

With nearly three full production cycles of the cow complete, the project has demonstrated that harvested forages can be nearly eliminated and replaced by grazing for maintenance of the cow. The savings of harvested forage fed to the cow has been about 2,700 pound per cow annually. An additional benefit is that less fossil fuel, equipment and labor would be needed for harvesting and feeding forages. Labor and equipment for calving appear to be greatly reduced by calving in late spring or early summer versus winter or early spring calving because protection and care from harsh weather are not needed and cows calve easier thus time spent calving is reduced. In our project, matching nutrient needs of the cow with natural grazed forages also resulted in greater flexibility and opportunity in marketing.

NE LNC 94-74

If farmers are to become meaningful participants in sustainable ag research, both in setting the research agenda and in carrying out and evaluating on-farm trials, then there is a clear need to better understand the variability of farmer perspectives, as well as the ways in which deep, place-bound, experiential knowledge can complement scientific knowledge. The present study employs qualitative and quantitative methods to address these needs and ultimately contribute to a better understanding of the conditions that enable the integration of animals into existing farming systems.

MI LNC 95-82



Innovations and Contributions

Research and Education Projects Inside Information

Environmental benefits of this project are: Increased soil biological activity in MIG compared to conventional grazing; Increased soil structural integrity, improved infiltration, and greatly increased surface cover; Improved stream physical, biological, and water quality characteristics; Improved grassland bird species habitat; Improved grassland bird habitat within grazing systems by using extended rest periods; Development of simple, inexpensive monitoring methods that improve awareness and understanding of ecosystem function; and Decreased veterinary costs without negative impacts to production or herd health.

MN LNC 94-75

Quality of life benefits of this project include: Lower-stress lifestyle and personal empowerment for farmers; Construction of an accepting and supportive network of practitioners that shares ideas and experiences; Development of techniques that surface underlying feelings or attitudes about farm goals and quality of life; and Identification that some quality of life factors, such as spirituality, cannot be adequately described or measured through survey instruments.

MN LNC 94-75

Team process benefits of this project are: Bridging the gap between farmers, university researchers, and agency staff; Empowerment of farmers by giving equal weight to their knowledge and observations; Development of a powerful model for future dialogue about our land, water and human resources; Demonstration of a practical, multidirectional, hands-on educational process that is highlighting the true potential of holistic, adaptive management; and Clarification of the terms profit and profitability which should benefit the discussion of farm economics at large.

MN LNC 94-75

Results from this study have the potential to add value to the grassland resource in Missouri and the region through marketing finished cattle. At the same time a segment of the cattle finishing program would be made more extensive and facilitate the return of animal waste back to the pastures, reducing the potential of point source pollution from a confinement facility.

MO LNC 94-76

We feel that one-on-one mentoring provides a positive relationship for technology transfer. It also works towards building community in rural areas. The evaluation of program participants supports these statements.

NE LNC 93-60



Innovations and Contributions

Research and Education Projects Inside Information

Those who were forage-based in their production systems were better able to survive the grain prices. Well-managed forage-based systems are sustainable from an economic standpoint and are much more sustainable than grain-based systems from an environmental standpoint.

NE LNC 93-54

This project has developed information that farmers can use to farm more sustainably through ridge tillage. It has also allowed farmers to improve their skills in weed and nutrient management.

IA LNC 92-44

It was clear that birds benefitted in minimum-tillage and organic farms, likely due to increased plant residues, relative to conventional cropping techniques.

ND ANC 93-15

Results of this research indicate that changes in at least some farming practices and systems could yield both increased farm profits and improved groundwater quality. In three of four case farm studies in eastern South Dakota, changes in farmers' practices associated with ICM or WQIP participation lead to increased profits (ranging from \$6 to \$30 per acre) and very little change in nitrate leaching.

SD LNC 93-55

The improved returns resulting from intensive grazing management should provide incentive for producers to maintain forages on highly erodible lands. Because the difference in soil erosion between the production of row crops and forages on highly erodible lands is 10.3 tons per acre per year, maintaining them in forages should significantly reduce this source of pollution. The greatest impact of this project may relate to the 2 million acres of land in Iowa which have been enrolled in the Conservation Reserve Program. If this project convinces farmers to leave 50 percent of this land in forages, then 10.3 million tons of soil will be kept out of above ground water sources in Iowa alone.

IA LNC 94-71

The most important benefit for students was learning the process of exploring available production information resources, planning a specific farm according to a set of goals and guidelines, and following through with implementation of the farm plan in the field.

NE LNC 94-73



Innovations and Contributions

Research and Education Projects Inside Information

Farm management decisions will include natural resource considerations. Nutrient cycling will occur to a greater extent on the farm, and to a lesser extent in the water. As we continue to analyze our data we will be able to approximate the amount of nitrate-N that is denitrified and the amount of phosphorus which is absorbed in the wetland system. We will also have estimates of the amount of nutrients contained in runoff. The coupling of farm and natural resource management will be utilized to enhance wildlife habitat.

SD ANC 92-11.1

The most important benefit from this project cannot be measured in dollars or bushels of corn – it is getting growers and researchers to consider the many trade-offs associated with all aspects of weed and crop management. We have also come to appreciate the complexity and difficulty in attempting to weigh benefits and risks of various management systems.

OH ANC 94-23

Uncertainty concerning amounts of fertilizer N needed on manured cornfields can be reduced by using the late-spring test for soil nitrate and end-of-season cornstalk test. The benefits of using such tests over current recommendations obviously depend on the reliability of current recommendations and existing management practices. However, use of the soil test enables site-specific recommendations that should enable most producers to increase their profits while decreasing environmental degradation associated with unnecessary applications of N fertilizers. Use of the cornstalk nitrate test provides important information on the effectiveness of current N management practices, including possible over-application of N fertilizers.

IA LNC 95-84

The participating farm families were able to manage their manure and on-farm nutrients more effectively through following a nutrient management plan. In particular, they were able to reduce starter and nitrogen fertilizer purchases at the same time that their yields increased. Approximately 500 farmers were introduced to whole-farm nutrient management concepts at field days and workshops. Obstacles to adopting whole farm nutrient and pest management plans on working farms were documented, providing useful information for the implementation of nutrient and pest management programs.

WI ANC 91-06



Asking Questions

We request that our project coordinators continue to ask questions beyond the scope of their project. So they let us know areas they feel need additional study in relation to their research. This gives our Administrative Council funding information and provides future direction to sustainable agriculture research and education. What follows are some suggestions for research topics from our project coordinators.

One area of further study that would be of benefit in herb production is a further look into the use of other organic mulches for specialty crops such as herbs, more specifically, using soybean residue as an organic mulch in the Midwest. Another area of focus would include the development of efficient harvest practices to optimize regrowth after herb harvesting. This would probably include the use of irrigation.

IA LNC 94-66

Four topics that deserve attention are: Determining the effect (compatibility) of herbicides on the survival of bindweed natural enemies; Evaluating the impact of naturally occurring predators and parasites on bindweed biological control agents; Determining the combined effects of plant competition and insect herbivory on field bindweed; and Assessing whether either or both natural enemies we have released become established and, if so, measuring their rate of dispersal and long-term impact on field bindweed.

KS ANC 93-18

There is a vast existing literature on swine welfare and principles of group housing of swine based on the natural behaviors of swine. However, these are seldom resorted to when universities design facilities for study of swine. These principles need to be put into practice in applied research and teaching on land grant university campuses so that new veterinary and animal science teaching candidates as well as animal science majors can have the opportunity to work with swine in unconfined environments.

IA LNC 95-80

Management of deep-straw beds for optimal composting, odor control, and pathogen destruction needs to be studied and taught. There are experts on these topics, but they are widely spread in the university and college system and livestock housing and research and livestock agriculture as a whole would benefit by bringing these experts together.

IA LNC 95-80



Innovations and Contributions

Research and Education Projects Inside Information

Education in the natural behaviors of all livestock species, including swine, needs to be enhanced at the high school and university levels and special workshops should be offered to extension, teaching and research faculty at land grant and non-land grant schools.

IA LNC 95-80

Applied research is needed to determine if cover crops such as mustard or oilseed rape could be used as a fall planting in the southern parts of Illinois where the weather is milder.

IL ANC 95-29

Many IMPACT groups are interested in improving farm profitability through alternative marketing opportunities. Two groups changed their emphasis in year two to include marketing farm products. These groups are asking for materials and information on direct marketing, farmer cooperatives, alternative financing, federal and state regulations on food processing, and business skills for these new enterprises. Current Extension, university, and commercial information sources are not aimed at providing answers for small, rural, or agricultural enterprises.

NE LNC 95-81

Detailed case studies of the economics of alternative farming and marketing practices would greatly aid the discussion of these practices' feasibility.

NE LNC 95-81

Our research supported by SARE is among the first (if not the first) in-depth fundamental studies of agroforestry in the U.S. beyond the windbreak research initiated in the 1930s. As such, we find ourselves (agroforesters) promoting land uses for which we have very little data, almost all of which is experiential, applied, and site-specific. There is a critical need for additional fundamental research in agroforestry if the results we have obtained through SARE are indicative of the yield increases we can derive through knowledgeable management.

IN LNC 94-72



Innovations and Contributions

Research and Education Projects Inside Information

Other plant configurations of the multi-species buffer strip should be tested. Various widths of the MRBS should be tested based on slope and up slope cropping practices. Riparian grazing systems should be studied in conjunction with the MRBS. Basic and applied research is needed to determine the fate of removed chemicals. Work is needed to quantify the changes in soil quality that can be expected over time as a result of the establishment of a riparian management system. Proper sizing and placement of wetlands in the agricultural landscape must be identified. Soil bioengineering models must be further developed. Willow posts can be used to slow gully erosion, but designs must be developed that will fit various sizes and depths of gullies found in varying soil types.

IA ANC 95-24

We believe the riparian management system that we are developing is adaptable to the urban environment, but research is needed to identify the different inputs and problems found in that environment. There is a need to conduct research on the benefits and costs of these systems, especially on the numerous intangible benefits of the system. Research is also needed on the perceptions of landowners to the need for riparian management systems and their willingness to adopt such systems. Watershed level studies are needed to assess the amount of land that would actually be taken out of row-crop or grazing production with the installation of a riparian zone management system.

IA ANC 95-24

It is anticipated that cover crops will be more widely used if they are integrated with livestock grazing management. Future research should be devoted to an integration of grazing and green manure cover crops.

KS LNC 95-83

Ecologists, entomologists and farmers should understand the relationships among distance between refuge areas, the relative size of these fragments, and the migration behavior of beneficial insects to propose alternatives for biological control.

MI LNC 95-85

Further studies need to be in: interaction of beef cattle genetics with low-input systems, interaction of intensive grazing systems with low input systems, and sustainable haying/grazing systems for native haylands.

NE LNC 94-74



Innovations and Contributions

Research and Education Projects Inside Information

Further documentation is needed to describe the different ways in which researchers and farmers sense the environment, view and describe the world, and make decisions. This information is imperative to understanding how to bridge the gap between land users, researchers and resource professionals.

MN LNC 94-75

A number of interesting, researchable questions include: Can farmer-accepted field measures of aggregate stability and biological activity be developed? What are the connections between soil quality and stream quality in MIG systems? Will farmers wade into a stream and turn over a rock to look for aquatic insects to help assess water quality? Are the economic advantages to farmers great enough, or the economic liabilities small enough, for a "bird-friendly" pasture system to be adopted on a significant scale? Are additional enhancements possible that would attract and hold less common bird species like meadowlarks, dickcissels, and grasshopper or vesper sparrows? Do current measures of economic well-being reflect farmers' values? How does the sustainable agriculture movement affect existing gender inequities or lack of parity on the family farm? and How and why is empowerment of all family members important to sustainability?

MN LNC 94-75

Study needs to be initiated to: Develop innovative marketing systems for pasture-finished beef; Determine the most appropriate type of cattle for pasture finishing; Determine the most appropriate plant species for pasture finishing. Determine most appropriate grain supplement formulation and amount for pasture finishing including level of fiber, protein, energy, minerals and protein quality; and Determine most appropriate management tools for pasture finishing, including level of pasture available needed, stocking rate, water availability, effect of feeding hay on pasture.

MO LNC 94-76

Farmers liked the mentoring process, but continuing efforts are needed to nurture the process from initial contacts by interested farmers to a successful mentor-mentee relationship. If left on their own many initial contacts would produce little follow-up. It seemed that an outside person (project coordinator) was needed to get both parties to advance further in the mentoring process. More work needs to be done in this area.

NE LNC 93-60

Work needs to be done on reaching those farmers that don't have the sustainable agriculture attitude toward farming.

NE LNC 93-60



Innovations and Contributions

Research and Education Projects Inside Information

Work needs to be done on: Cover crops for grazing during the winter and spring months; Impact of spring grazing of cornstalks with or without cover crops on subsequent crop production; Summer grazing options; Fall grazing options; Time of removal from pasture to feedlot; and the Possibility of producing lean, palatable beef from cattle produced primarily on forage with minimal time spent in the feedlot.

NE LNC 93-54

Nonchemical weed control, cover crops/forage crop research, tillage and erosion research, and nitrogen correlation and recommendations need to be further studied.

IA LNC 92-44

There needs to be additional research on identifying later maturing legumes that maximize nitrogen addition and other benefits to organic farmers and maximize the reproductive success of ground nesting birds. Additionally, there is a need to identify techniques that increase plant residues in cropped fields to maximize wildlife benefits and decrease soil erosion. Lastly, there is a need to integrate practices of minimum-tillage and organic farmers into conventional farming practices; research should focus on identifying means to facilitate the missing of interests and maximize information exchange among advocates of the various farming practices.

ND ANC 93-15

Much more study is needed on how different combinations of crop and livestock systems are likely to affect both farm profits and water quality in areas with shallow aquifers. The study described in this final report examined only crop systems, a large task in itself. Because of the extensive data and resource requirements, few have studied crop/livestock systems jointly (from profitability and environmental quality standpoints). However, long-term funding for such work is badly needed.

SD LNC 93-55

Research is needed on how farmers' responses to risk under the new, more market-oriented Federal farm bill are likely to affect their adoption of more environmentally sound farming practices and systems.

SD LNC 93-55



Innovations and Contributions

Research and Education Projects Inside Information

There is a need to develop new cover crops, including medics, that have more early season vigor, which would allow them to compete more effectively with early season weeds, particularly foxtail. They need to be evaluated for their shade tolerance. This is most important in cropping systems where the medic will be interseeded with a small grain, either as a forage or as a green manure crop. The use of medics in conjunction with reduced rates of herbicides also needs to be evaluated. It is also important we understand nitrogen dynamics of the use of these new legumes as cover crops and as green manures to better understand how they can contribute to nitrogen needs of crops in rotation.

MN LNC 93-58

First, there is relatively little known about the best forage species and management practices for grazing in late winter to minimize production costs associated with stored feeds. Not only does animal production need to be studied, but also the effects of the grazing system on forage growth and soil compaction. Furthermore, because it is apparent that grazing management in early spring affects seasonal productivity of summer pastures, the optimum conditions at which to initiate grazing in the summer pastures needs to be identified. Much of past grazing research has begun after growth was adequate in late April or early May. Such an approach does not address the situation on the farm where the question is "When can I begin grazing?" Finally, supplementation regimes to optimize the productivity of different animal species from grazing systems need to be studied and identified.

IA LNC 94-71

The following areas need more study: Innovative ways of helping students meet the learning objectives; Effectiveness of different reward strategies to help students meet project deadlines; Methods of evaluating student performance and progress toward learning objectives; and Field methods of evaluating impact of different farming systems on the environment.

NE LNC 94-73

Two very important areas for further study are: The development of specific management practices for wetlands in agricultural landscapes; and Long-term studies to determine the impacts of weather on the model farm scenarios that have been developed. Our data has been collected during three extremely wet growing seasons. Data is needed for a full spectrum of weather conditions.

SD ANC 92-11.1

High-risk, exploratory research, including surveys for biocontrol organisms needs to be done. Long-term crop/weed management studies to understand how species shifts occur and effects of landscape elements on weed and other pest population dynamics also need to be researched.

OH ANC 94-23



P roducer Grants

Implementing Sustainable Organic Practices	116
Cover Crop Management in the Upper Midwest	116
Composting Poultry and Swine Carcasses	117
On-Farm Food Waste Composting	117
Suitability of Hardy, Non-Native Forage-Adapted Meat Sheep to North American Management Intensive Grazing System	118
Evaluation of Kura Clover in Intensive Grazing Systems	118
Converting Continuous Grazing to Management Intensive Grazing: Loess Hills Restoration	119
Intensive Grazing Economic Study	119
Winter Barley Breeding: By the Public	120
Stockpiling Pasture by Interseeding Annual Rye into Existing Pastures	121
The Development of an On-Farm Learning Center	121
Improving Ground and Surface Water Quality by Reducing Commercial Fertilizer Applications to Land Receiving Livestock Manures	122
Nitrogen Management on Sandy Soils for Environmentally and Economically Sustainable Corn Production	122
Winter Farrowing in a Low-Input System	123
Developing Weed Control Methods for Organic Raspberry Production	123
Living Mulches in Minnesota Wheat	124
Harvesting Wildflower Seed Crops from Marginal Land	124
Getting Started in Farming through Sustainable Agriculture	125
Measuring the Rate of Benefit Accrual Due to Adoption of a Management Intensive Grazing System of a North-Missouri Hill Farm	125
On-Farm Research to Raise Slaughter Beef on Pasture and Grain	126
Sustainable Plum Curculio Control in Apple Orchards	126
Tar Box Hollow Living Prairie	127
Native Elderberry and Plums as an Income Source from Waste Ground	127
Bio-Control of Canada Thistle	128
Establishing Legumes in Cool Season Grass Pastures	128
Nebraska CRP Research Project: Comparing Alternative Uses of Land Currently in the CRP Program	129
Pastured Poultry	129
Incorporating Holistic Resource Management	130
Identifying Management Practices that Enhance the Probability of Producing Quality Durum Wheat	130
Interseeding Field Peas and Yellow Mustard for Enhanced Moisture Retention and Harvesting Ease in a No-Till System	131
Protecting Beneficial Arthropods in Ohio Orchards	132
Building Community in CSAs: A Canning Project	132
Measuring Nitrogen Benefits of Hairy Vetch Cover Crop for Corn Production and Evaluating a Portable Soil Nitrate Test Kit	133
Free-Range Poultry: Production and Marketing	133
Alternative Strategies for Building Soil and Soil Erosion Control	134
Rotational Grazing Management Internships	135
Orchard Mason Bees: Collection and Use in Southwest Wisconsin	135
Lane Construction and Pasture Renovation	136



Illinois

FNC 95-99

Implementing Sustainable Organic Practices

Project Coordinator:
Larry Kennel
R.R. 1
Lowpoint, IL 61545
309-443-5257

SARE Funding:
\$3,620

Organic crop production presents a unique set of problems when applied to corn/soybean/wheat production on marginal soils.

Objective: To develop a strip cropping system (30-foot strips) to maintain fertility, reduce soil erosion, protect water quality, reduce costs, control weeds, and enhance production on marginal soils without chemicals or commercial fertilizers.

Results: With a crop rotation of corn/beans/wheat/alfalfa, utilizing alfalfa strictly as a green manure cover crop, yields of corn, beans, and wheat were comparable to conventional production. Net income on the organic production averaged \$100 per acre higher than conventional production due to premiums paid. Adequate weed control was accomplished with rotary hoeing and cultivation.

FNC 95-117

Cover Crop Management in the Upper Midwest

Project Coordinator:
Kim Burkhart
3597 W. Lightsville
Leaf River, IL 61047
815-738-2392

SARE Funding:
\$2,332

Water quality concerns and the increasing costs of off-farm inputs provide encouragement for alternative farming practices.

Objective: To aerially seed rye into standing corn and alsike clover into standing soybeans to alleviate soil erosion and provide green manure for crop nutrients and allelopathic mulch for weed control and moisture retention.

Results: Awaiting final report for data on yield, weed control and soil tests.



Indiana

FNC 95-93

Composting Poultry and Swine Carcasses

Project Coordinator:
Mark Hart
Rt. 6, Box 241
Portland, IN 47371
219-335-2482

SARE Funding:
\$4,926

Disposal of animal carcasses in an economical manner while avoiding transmission of disease is a difficult task. Composting provides an alternative that is environmentally friendly while providing a valuable by-product.

Objective: To construct an on-farm composter for disposal of animal carcasses. This avoids the costly method of freezing dead animals and delivering them to a collection point on a weekly basis where there is a very high potential of transmitting disease.

Results: Composting structure of concrete with a wood roof was erected on the farm. The composter utilizes turkey litter as primary carbon source and is monitored daily for moisture and temperature. Early data indicates disposal costs were reduced by 50 percent with consideration given to the value of finished compost. Side by side comparison of compost and turkey litter in corn production resulted in an 11-bushel increase where compost was applied.

FNC 95-112

On-Farm Food Waste Composting

Project Coordinator:
Larry Whinery
188 E. 100 S.
Huntington, IN 46750
219-468-2345

SARE Funding:
\$5,000

Composting of non-recyclable organic materials not only relieves the tremendous pressure on landfills, but also provides a valuable product to enhance soil fertility and tilth.

Objectives: 1) to offer composting as an alternative to landfilling of waste food and other non-recyclable organic wastes, and 2) to combine rural waste, such as manure and waste fodder, with urban food and paper waste and turn them into a valuable commodity.

Results: It was shown that without large capital costs, food wastes from restaurants, supermarkets, school cafeterias, etc. could be diverted from landfills and combined with rural wastes, such as straw and manure, in an on-farm composting project. Analyses of the compost revealed no harmful heavy metals or pathogens. No attempt was made to explore the marketing/disposal of the compost, other than utilizing it as an on-farm organic fertilizer.



Iowa

FNC 95-100

Suitability of Hardy, Non-Native Forage-Adapted Meat Sheep to North American Management Intensive Grazing System

Project Coordinator:
Stephanie Mitcham
2427 220th St.
Tripoli, IA 50676
319-279-3270

SARE Funding:
\$5,000

Sheep can provide a profitable alternative in an intensive grazing operation where all family members can participate and spend quality time.

Objective: To study the Dorper breed of sheep, a hardy, meat-type developed in South Africa. The Dorper, a non-seasonal breeder, developed specifically for efficient pasture utilization, was compared to other more common breeds currently being used. The study was conducted to examine performance of the Dorper in an intensive grazing setup. Rate of gain, back fat and rib-eye measurements of Romanov Dorper and Romanov Dorset were compared.

Results: The mean adjusted 50-day weights and 100-day weights were not significantly different in the comparison. However, although both crosses were quite lean, back fat was significantly higher at the 0.001 level and rib-eye area was significantly larger for the Dorper crosses.

Yearling Dorpers seemed to maintain condition on much less feed than other breeds of the same age.

FNC 95-124

Evaluation of Kura Clover in Intensive Grazing Systems

Project Coordinator:
David B. Kendall
30602 Mill Creek Road
Bellevue, IA 52031
319-872-5652

SARE Funding:
\$538

As more producers become involved in management intensive grazing, the need to evaluate alternative forage species that may be better suited to management intensive grazing systems also increases.

Objective: To evaluate establishment practices for kura clover (*Trifolium ambiguum*) and its compatibility with other perennial plants in a management intensive grazing system.

Results: Final report not yet available.



Iowa

FNC 95-127

Converting Continuous Grazing to Management Intensive Grazing: Loess Hills Restoration

Project Coordinator:

David Zahrt
R.R. 1, Box 53
Turin, IA 51059
712-353-6772

SARE Funding:
\$3,399

Management intensive grazing can play a vital role in controlling erosion and restoring native vegetation in the Loess Hills of western Iowa.

Objectives: Implement rotational grazing system by: 1) subdividing pastures, 2) installing watering systems in paddocks, 3) frostseeding legumes in cool season pastures, and 4) utilizing prescribed burning and cutting to control eastern red cedar and enhance native vegetation.

Results: Utilizing management intensive grazing and implementing cedar control practices, the grazing season was extended 30 days and native warm season grasses and forbs began to flourish. Species such as big bluestem, Indian grass, and numerous native forbs, which had not been observed for years, began to recur.

FNC 95-95

Intensive Grazing Economic Study

Project Coordinator:

M.O. Pitcher
3301 223rd Ave.
Maquoketa, IA 52060
319-652-4623

SARE Funding:
\$4,545

Management intensive grazing has proven to be an environmentally sound practice on marginal land. In order for this system to be adopted, it must be proven to generate a higher return per acre than less sustainable enterprises.

Objectives: 1) to establish and operate a management intensive grazing system for beef cattle/cow-calf, and 2) to generate detailed economic records to determine feasibility of producing beef on well managed pasture in an area where highly erodible land is not compatible with row crop production.

Results: The start-up year presented a challenge in evaluating economic outcome results. However, 30 cow-calf pairs on a 45-acre, 9-paddock grazing system produced 236.33 pounds of calf per acre in 125 days. In addition, cows gained 1.2 pounds per day. Supplemental hay was fed during 15-day AI breeding.



Kansas

FNC 95-111

Winter Barley Breeding: By the Public

Project Coordinator:
Walter Pickett
529 S. Chestnut
Lindsborg, KS 67456
913-227-2800

SARE Funding:
\$2,526

With declining interest in minor crops by public and private plant breeding programs, there is a need to preserve important breeding lines and germ plasm of these crops to enhance diversity in sustainable agriculture systems.

Objective: To multiply and distribute diverse winter barley populations to farmers for propagation and feed grain use.

Results: Final results not yet available due to very poor 1996 crop resulting from adverse weather conditions. The project was extended for one year for further study.



Michigan

FNC 95-122

Stockpiling Pasture by Interseeding Annual Rye into Existing Pastures

Project Coordinator:
Chuck Conillie
12947 Byron Road
Byron, MI 48418
810-266-4708

SARE Funding:
\$640

Reducing winter feed costs for beef cow herds can be enhanced by an expanded grazing season.

Objectives: Compare three methods of stockpiling forage for early spring grazing: 1) pulling cows off perennial cool season pastures from mid-August to September; 2) pulling cows off perennial cool season pasture in mid-August, interseeding rye (no-till), and reintroducing cows in April; and 3) pulling cows off perennial cool season pasture in mid-August, spraying with Gramoxone for burndown, and no-tilling rye into burned down grass. Control plot would be grazed through November with late April turnout.

Results: A very dry August and September resulted in poor to zero stands of rye. Therefore, no feed advantage was gained from the rye. Economic results favored the control paddock by \$5 to \$33 to the acre. Results indicated that eliminating fall grazing does improve early spring growth; however, the extra spring growth did not compensate for loss of fall grazing days.

FNC 95-109

The Development of an On-Farm Learning Center

Project Coordinator:
Bob and JoAnn Fogg
3043 Olds Road
Leslie, MI 49251
517-589-9290

SARE Funding:
\$5,000

The continuing decline in the number of family farms has created a need to fill the void in communication and knowledge between producer and consumer.

Objectives: 1) to provide ongoing community education regarding the production, purchase, preparation and consumption of whole foods; 2) to provide on going promotion and education for producers regarding sustainable agriculture practices; and 3) to provide a regional based marketing outlet and distribution center for organic producers.

Results: Final report not yet available.



Michigan

FNC 95-125

Improving Ground and Surface Water Quality by Reducing Commercial Fertilizer Applications to Land Receiving Livestock Manures

Project Coordinator:
Calvin Dyke
9273 Garfield
Coopersville, MI 49404
616-837-6460

SARE Funding:
\$4,644

With increasing concerns about water quality, coordinating crop needs, manure credits and fertilizer application becomes all important.

Objective: To reduce nitrogen and phosphorus fertilizer usage on land receiving adequate nutrients from livestock manure, thereby maximizing nutrient uptake and managing potential water pollution at the source.

Results: Based on soil tests and Michigan State University recommendations, Ottawa County farmers reduced or eliminated phosphorus in starter fertilizers at a savings of \$10 to \$22 per acre with no reduction in corn yields. Project was extended for one year to repeat trials and gather additional data.

FNC 95-113

Nitrogen Management on Sandy Soils for Environmentally and Economically Sustainable Corn Production

Project Coordinator:
Ed Groholski
1230 12 Mile Road
Burlington, MI 49029
517-765-2111

SARE Funding:
\$5,000

Economics and water quality concerns mandate a more efficient nitrogen management system on today's farm.

Objective: To utilize the "Soil Doctor" – an on-the-go, soil nitrate testing, variable rate nitrogen applicator – in order to maximize utilization of on-farm forms of organic nitrogen.

Results: Six replicated strips 12 rows wide comparing the "Soil Doctor" with Michigan State University sidedress recommendations resulted in 20 percent less nitrogen applied by the on-the-go tester/appliator, with no significant reduction in yield. Additional data will be collected in future tests to add credibility to initial findings.



Minnesota

FNC 95-89

Winter Farrowing in a Low-Input System

Project Coordinator:
James Van Der Pol
4075 110th Ave. N.E.
Kerkhoven, MN 56252
612-847-3422

SARE Funding:
\$3,991

Long cold winters in Minnesota make it difficult to achieve two farrowings per sow per year in a pasture-based swine production system. If the problem can be solved without large capital investment, smaller farmers have a chance of competing with larger, integrated confinement systems.

Objective: To erect a "Bio-Tech Hoop Structure" to be utilized with deep bedding and porta huts for late March farrowing and summer finishing.

Results: First year farrowing was quite successful. Following weaning the sows were turned out to pasture and the structure was utilized as a finishing unit. The project was extended for one year to allow for additional outreach activities and data collection.

FNC 95-102

Developing Weed Control Methods for Organic Raspberry Production

Project Coordinator:
Kevin Edberg
2408 Ronald Ave.
White Bear Lake, MN 55110
612-296-6382

SARE Funding:
\$4,700

The major impediments in expanding production of organically grown raspberries are weed control and fertility.

Objective: Testing efficiency and effectiveness of two options for in-row weed control: straw mulch and corn gluten meal (CGM). Evaluation consists of: 1) effectiveness of in-row weed suppression, and 2) impact on total yield and earliness of harvest.

Results: Data obtained in this demonstration determined that CGM was effective in controlling weeds in raspberries for approximately one month, with better weed control as rate of CGM was increased. Further studies are needed to determine optimum balance between weed control and crop nitrogen requirement. Project was extended for one year to gather additional data.



Minnesota

FNC 95-91

Living Mulches in Minnesota Wheat

Project Coordinator:
Dave Birong
35805 535th Ave.
Grove City, MN 56243
320-773-5245

SARE Funding:
\$1,373

Increasing costs of fertilizers and herbicides have encouraged producers to use alternative methods to lower costs while maintaining fertility and controlling weeds. Living mulches are being examined as an environmentally friendly replacement to outside inputs.

Objectives: To demonstrate economic and environmental benefit of living mulch (*Caliph Medic*) in winter wheat. Two specific objectives were: 1) reduce leaching of nitrogen into groundwater, and 2) smother weeds while growing as green manure.

Results: Wheat yields in living mulch strips were 90 percent of fertilized strips and 128 percent of control strips with 10 pounds more nitrate nitrogen at years end than either fertilized or control. Other benefits were reduced soil erosion, additional organic matter, and improved soil tilth.

FNC 95-98

Harvesting Wildflower Seed Crops from Marginal Land

Project Coordinator:
Frank Kutka
2323 Co. Road 6
Barnum, MN 55707
218-389-3320

SARE Funding:
\$1,819

Wildflower production on marginal lands offers a viable option for increasing farm income while enhancing the environment and adding value to under utilized lands.

Objective: To test and compare economics of two harvest techniques at various locations and demonstrate these methods to interested producers.

Results: The comparison of hand collecting and machine harvesting of a number of species has been completed. But the project has been extended for six months to allow for completion of data collection on the separation and cleaning of various species. The final report will include data on harvest timing, harvesting techniques, seed handling, seed cleaning, and seed quality of the different species.



Missouri

FNC 95-103

Getting Started in Farming through Sustainable Agriculture

Project Coordinator:
James Lummus
R.R. 3 Box 351
Concordia, MO 64020
816-463-2133

SARE Funding:
\$4,996

To overcome the high capital requirements needed for traditional farming operations, other opportunities must be developed to allow beginning farmers to become established in agriculture.

Objectives: 1) to demonstrate the processes, applications and opportunities beginning farmers must deal with to convert a traditional cash grain operation to a diversified self sustaining farming system, and 2) to identify and bring together farmers in west central Missouri who are interested and involved in developing sustainable farm systems in order to share experiences and initiate networks.

Results: Due to adverse weather conditions, the project was not fully implemented in 1996 and has been extended for one year.

FNC 95-115

Measuring the Rate of Benefit Accrual Due to Adoption of a Management Intensive Grazing System of a North-Missouri Hill Farm

Project Coordinator:
Martin Turner
13981 Colorado Ave.
Elmer, MO 63538

SARE Funding:
\$4,494

Transitioning from conventional to rotational grazing with limited resources requires producers to allocate capital in areas of greatest benefit.

Objective: To collect a consistent set of data on soil, forage quality, livestock performance, and financial results that will make it possible to measure the rate at which these benefits accrue over time.

Results: The project was extended one year to gather additional data; however, early data resulted in a reduction of the cow herd and addition of a stocker operation, which allowed for greater use of stockpiled forage and less reliance on hay.



FNC 95-92

On-Farm Research to Raise Slaughter Beef on Pasture and Grain

Project Coordinators:
Bob Cessac
2362 State Road O
Higbee, MO 65257
816-248-5201

SARE Funding:
\$3,442

Higher production costs and lower profit margins have forced cattle producers to seek alternative production and marketing practices. Retaining ownership and adding value to calves offers producers the potential to increase profits.

Objective: To retain ownership of calves and finish them to slaughter weight by feeding grain in conjunction with a leader/follower management intensive grazing program and direct marketing finished beef.

Results: Heifers averaging 444 pounds were put through a follower/leader grazing system on stockpiled fescue in the fall of 1995 and on pasture in 1996. Heifers were grain fed on grass from July to October. Marketing took place in October with half sold live at auction and half marketed in the beef directly to consumers. Cattle sold in the beef to consumers provided \$223.75 per head extra income compared to those sold live at auction.

FNC 95-116

Sustainable Plum Curculio Control in Apple Orchards

Project Coordinator:
Dan Kelly
Rt. 2, Box 223B
Canton, MO 63435
573-655-4291

SARE Funding:
\$3,242

New and innovative practices are required when trying to control pests and maintain quality in organic fruit production.

Objective: To control plum curculio in apple orchards with a trap crop of native warm season grasses planted around the perimeter of the orchard for overwintering of curculio. Fire (controlled burning of grasses) will be used as bio-control of curculio when peak emergence takes place.

Results: This project was extended for one year to allow additional time for establishment of warm season grasses.



Nebraska

FNC 95-126

Tar Box Hollow Living Prairie

Project Coordinator:
Monty, Larry and Rose Mason
R.R. 1, Box 8
Dixon, NE 68732
402-584-2337

SARE Funding:
\$5,000

Information on keeping CRP lands in grass and producing a profit is vital to landowners and advisors as CRP contracts reach maturity.

Objective: Focus on long-term management of native and introduced grass species that were seeded into CRP acres that will be utilized for livestock production. Project targeted water systems, paddock design, and animal impact.

Results: The Masons have converted CRP acres into a successful management intensive grazing enterprise by raising bison and using a Global Positioning System (GPS) to collect information on plant density, plant health, plant species, and manure distribution. This has enabled them to increase stocking rates while enhancing range condition and wildlife habitat.

FNC 95-106

Native Elderberry and Plums as an Income Source from Waste Ground

Project Coordinator:
Nancy Jorgenson
Rt. 1, Box 23
Dawson, NE 68337
402-855-2265

SARE Funding:
\$4,584

Marginal waste areas, a part of most farms, can provide extra income by incorporating native flora into existing farm management.

Objectives: 1) to demonstrate the potential value of native elderberry and wild plum as alternative income crops, and 2) to conduct trials in transplanting and propagating native species on waste acres.

Results: Project was extended for one year to gather additional data on transplanting, harvesting, and marketing.



Nebraska

FNC 95-119

Bio-Control of Canada Thistle

Project Coordinator:
Dennis Demmel
Rt. 1, Box 286
Ogallala, NE 69153
308-352-4078

SARE Funding:
\$1,518

Minimum and no-till farming, although having many positive aspects, have enhanced the spread of perennial noxious weeds in some cropping situations; consequently, long-term, cost effective, environmentally sound weed control is required.

Objective: Long-term control of Canada thistle, particularly in irrigated cropland, by utilizing beneficial stem mining weevils and defoliating beetles.

Results: Beneficial insects were released in the spring of 1996 in undisturbed areas, such as fence rows, pond edges, etc. where there was heavy thistle infestation. The intent was to allow populations of beneficial insects to increase and move into thistle infested cropland. The project was extended for one year to gather data on population and movement of beneficial insects.

FNC 95-123

Establishing Legumes in Cool Season Grass Pastures

Project Coordinator:
Jon Immink
57230 703 Road
Endicott, NE 68350-3005
402-442-2234

SARE Funding:
\$1,175

Legume components in grass pastures not only enhance carrying capacity and animal performance, but also reduce or eliminate commercial nitrogen applications.

Objectives: 1) to find the most effective means of establishing legumes in existing grass pastures, and 2) to examine various legumes for quality and quantity of forage production.

Results: Initial results of drilling and frostseeding grazing alfalfa, birdsfoot trefoil, red clover, and lespedeza were less than expected. However, enough seedlings were found to offer encouragement. Project was extended one year for further evaluation.



Nebraska

FNC 95-96

Nebraska CRP Research Project: Comparing Alternative Uses of Land Currently in the CRP Program

Project Coordinator:
Kenneth Widener
Rt. 2, Box 96
Tekamah, NE 68061
402-377-2788

SARE Funding:
\$4,960

Considering the uncertainty of the future of the CRP program and the potential for erosion from highly erodible land, seeking alternatives to cropping of CRP acres when contracts expire may prove very worthwhile.

Objective: To demonstrate alternative uses of CRP acres seeded to big bluestem, switch grass, and brome by comparing management intensive grazing to a simple rotational grazing system. Beef cows/calves were used to collect data on the economics of the systems compared to historical crop production. Demonstrations also included fencing, watering, and grazing techniques.

Results: By including costs such as terracing to bring land into conservation compliance, the grazing system had considerable advantage. When conservation compliance costs were omitted, corn/soybeans held a slight advantage using historical yield data and 1995 commodity prices.

FNC 95-94

Pastured Poultry

Project Coordinator:
David Bosle
R.R. 2, Box 206
Hastings, NE 68901
402-462-9424

SARE Funding:
\$5,000

Project is to offer opportunity and profit for growers and provide a superior product to consumers.

Objectives: 1) to broaden the agricultural diversity of the community; 2) to provide a low-cost entry level vehicle to beginning farmers; 3) to offer an alternative enterprise for existing farmers; and 4) to provide a superior product directly to consumers while utilizing a system that is environmentally more friendly than conventional confinement systems.

Results: The project was extended for six months to gather additional data. Broilers are produced in movable cages on pasture without antibiotics, hormones, coccidiostats, or germicides. The excellent acceptance and increased demand by consumers of poultry produced in 1996 has allowed producers to expand in 1997.



FNC 95-120

Incorporating Holistic Resource Management

Project Coordinators:
Larry and Judy Woodbury
6295 Co. Road 23
McLeod, ND 58057
701-439-2605

SARE Funding:
\$4,423

Holistic resource management can provide an avenue of resolution by meeting concerns of both the ranch/farm community and wildlife/environmental interests.

Objective: To implement a rotational grazing system on private and federal lands to improve biodiversity, increase plant vigor, provide residual nesting cover for upland game birds, conserve habitat for a federally listed threatened plant (western prairie orchid), and provide a stable forage base that will support a viable ranching operation.

Results: Fencing was installed to subdivide pastures into sizes that would accommodate an intensive management grazing system where rotations averaged four to five days with approximately 60 days recovery time. In only one year, carrying capacity increased 29 percent with more native warm season grasses and forbs appearing. Cover for wildlife was enhanced and nutrient cycling was improved.

FNC 95-128

Identifying Management Practices that Enhance the Probability of Producing Quality Durum Wheat

Project Coordinator:
Lawson Jones
Rt. 2, Box 90
Webster, ND 58382

SARE Funding:
\$5,000

Sustainable farming practices can and do have a positive effect on crop quality and profitability.

Objective: To survey producers who participated in a traveling seminar relating to producer understanding of agricultural practices that enhance production of high quality durum wheat.

Results: The survey identified several items relating directly to quality in durum wheat production. Most often mentioned were crop rotation, variety selection, and harvest moisture. Three out of four producers identified production practices they have implemented in response to environmental concerns.



North Dakota

FNC 95-90

Interseeding Field Peas and Yellow Mustard for Enhanced Moisture Retention and Harvesting Ease in a No-Till System

Project Coordinator:

Vern Mayer
HCR 1, Box 81
Regent, ND 58650
701-563-4631

SARE Funding:
\$4,980

Diversification of wheat/fallow systems due to economics, environmental concerns, federal farm program changes, etc. has challenged producers to attempt alternative crop and management practices to break weed and insect cycles, provide crop nutrients, enhance moisture retention, and facilitate harvesting.

Objectives: Interseed field peas and yellow mustard in alternate rows to: 1) determine if sufficient crop residue will remain after harvest to catch snow and prevent soil erosion; 2) determine if alternate row seeding of peas and mustard results in reduced crop loss of peas and improved crop quality; and 3) determine profitability of the enterprise compared to peas planted alone.

Results: The field pea/mustard combination resulted in 1.7 to 2.0 times greater moisture retention, reduced soil erosion, 48 percent reduction of crop loss at harvest and \$1.32 return for each \$1 invested in variable cost in a drought stressed situation. Other benefits were nitrogen benefit from peas for the following crop, breaking weed and disease cycle, and faster harvest.



Ohio

FNC 95-104

Protecting Beneficial Arthropods in Ohio Orchards

Project Coordinator:
Bradley Phillips
28 E. Main St.
Berlin Heights, OH 44814

SARE Funding:
\$4,995

While addressing consumer concern of food safety and the environment, fruit producers are challenged to alleviate those concerns as well as addressing economic concerns for the continual well being of their farms and families.

Objective: Monitoring and protecting beneficial arthropods and encouraging populations to develop to levels necessary to incorporate them into sustainable production systems based on reduced pesticide applications.

Results: Beneficial arthropods were observed by hired scouts in all participating area apple orchards with spraying conducted only when required compared to calendar-based systems. While a scouting-based system proved to be more complicated to plan and control than a calendar-based system, the results showed that the number of sprays per season were reduced, San Jose scale control was enhanced by timing spraying to "crawler" emergence and populations of predator mites and ladybird beetles provided significant control of European red mites with the reduced spraying program.

FNC 95-105

Building Community in CSAs: A Canning Project

Project Coordinator:
Ted Bartlett
Silver Creek Farm
7097 Allyn Road, P.O. Box 254
Hiram, OH 44234-0254

SARE Funding:
\$4,963

There is a great deal of support for utilizing CSAs as an economically viable kind of outreach. However, long-term success depends on fine tuning and community spirit.

Objective: To build a sense of community and ownership between shareholders and growers by bringing together shareholders and owners of three local CSAs in a canning project. Based on journals kept by each producer, a manual is being prepared to be used by other CSAs with similar concerns.

Results: The project was extended to allow completion of the manual.



Ohio

FNC 95-108

Measuring Nitrogen Benefits of Hairy Vetch Cover Crop for Corn Production and Evaluating a Portable Soil Nitrate Test Kit

Project Coordinator:
Rich Bennett
7-740 Road P-3 Rt. 3
Napoleon, OH 43545
419-748-8187

SARE Funding:
\$1,815

Soil nitrate tests are quite valuable in creating an awareness of the benefits of cover crops.

Objectives: 1) to demonstrate whether hairy vetch can economically provide nitrogen for corn production in north-west Ohio, and 2) to evaluate a portable soil test kit for measuring pre-sidedress soil nitrate levels.

Results: In six 30-foot wide randomized strips, hairy vetch was seeded in wheat stubble in August 1996 with a control strip between each hairy vetch strip. All strips were tested for soil nitrate to compare portable soil nitrate tester and soil samples sent to an analytical laboratory. The results revealed no significant difference between the two methods. Based on soil nitrate tests, the hairy vetch strips planted to corn required 90 pounds per acre less sidedress nitrogen than the control strips. There was no significant yield difference and a savings of \$2.60 per acre in favor of hairy

vetch, with no consideration given to the benefits of reduced soil erosion or the increase in organic matter.

FNC 95-118

Free-Range Poultry: Production and Marketing

Project Coordinator:
Linda L. Lee
Rt. 2, Box 18
Creola, OH 45622
614-596-4379

SARE Funding:
\$4,690

Rural Communities and small farms can be revitalized by innovative value-added enterprises that offer alternatives to conventional cropping systems.

Objective: To educate potential poultry producers about a viable, low-cost method to produce, process and direct market poultry and eggs from the farm within a geographic region.

Results: Field days, cosponsored by various sustainable agriculture organizations, were held; workshops for interested poultry producers were conducted; and farm tours for students were sponsored. In addition, a how-to guide for raising, processing and marketing poultry and eggs, entitled "Free-Range Poultry Production and Marketing," was produced.



South Dakota

FNC 95-107

Alternative Strategies for Building Soil and Soil Erosion Control

Project Coordinator:
Vincent Meyer
R.R. 1, Box 95
Milbank, SD 57252
605-432-4096

SARE Funding:
\$5,000

As off-farm inputs continue to increase, other methods of maintaining production must be implemented. Maintaining soil quality with on-farm practices provides a viable alternative.

Objective: To study the economic viability of overseeding rye and vetch into standing soybeans and sunflowers to decrease soil erosion, increase organic matter, and provide nutrients for future crops.

Results: Overseeding was completed in 1996 and project was extended for one year to gather soil and crop yield data.



FNC 95-101

Rotational Grazing Management Internships

Project Coordinator:
Dan Forsythe
Lakeland Ag Complex
W. 3929 Co. Road NN
Elkhorn, WI 53121
414-741-2252

SARE Funding:
\$5,000

With management intensive grazing rapidly gaining popularity, education and training of young people cannot be over emphasized.

Objectives: 1) to provide practical experience and training in rotational grazing systems management to young farm interns; 2) to document and demonstrate the potential productivity and profitability of utilizing intensive rotational grazing management for raising replacement dairy heifers in southeast Wisconsin; and 3) to increase the impact and educational outreach of the rotational grazing research component of the Wisconsin Integrated Cropping Systems Trial.

Results: No results available as the project was extended for one year to gather additional data.

FNC 95-121

Orchard Mason Bees: Collection and Use in Southwest Wisconsin

Project Coordinator:
W. Ryan Wilson
W. 8247 Co. P
Browntown, WI 53522
608-325-5215

SARE Funding:
\$2,545

Crucial to fruit production is timely and efficient pollination. Pesticide and disease problems may require less reliance on honeybees for pollination purposes.

Objective: To test feasibility of collecting and utilizing orchard mason bees native to southwest Wisconsin and importing additional orchard mason bees to build a population adequate for apple orchard pollination.

Results: Project had limited success in 1996 due to adverse weather conditions and a high mortality rate of the bee population. Project was extended for one year for further study.



FNC 95-97

Lane Construction and Pasture Renovation

Project Coordinators:
Myron and Marcie Herek
3712 Custer Road
Stevens Point, WI 54481
715-592-4104

SARE Funding:
\$4,005

Maintaining high quality pastures and traffic lanes are two major elements associated with management intensive grazing in dairy operations.

Objectives: 1) to establish permanent erosion resistant traffic lanes that will support heavy equipment in all weather conditions, using materials that will not cause hoof damage or injury to dairy cows, and 2) to experiment with various methods of establishing and maintaining legumes in grass-based pastures.

Results: Two methods of lane improvement being tested were: 1) sand/dirt base, 6-inch road mat (sand and aggregate), geotextile road fabric and 6- to 8-inch crowned crushed limestone; and 2) sand/dirt base, 6-inch road mat and 6- to 8-inch crowned crushed black top (from county road department). Both methods worked very well the first year. Additional time is needed to determine durability of both methods. Legume establishment, utilizing red and ladino clover broadcast after spring thaw, was very successful.



PDP Grants

North Central Sustainable Agriculture Training Project	138
North Dakota/South Dakota Professional Development Project	140
Experiential Co-Learning for Professional Development in Sustainable Agriculture	141
Increasing Trainer Literacy in Sustainable Agriculture	143
Grazing Systems for Sustainable and Profitable Agriculture	144
A Comprehensive Educational Program for "Training the Trainers" in Sustainable Agriculture in Minnesota, Wisconsin, and Iowa	145
Building Collaboration Partnerships with Farming Systems Research and Extension	146
Life after CRP	148
Local Sustainable Agriculture Team Building: A Sustainable Agriculture Training Model	149
Quality of Life Module for Extension Professional Development	150
Sustaining a Desirable Quality of Life through New Agricultural Opportunities for Farm Families on Small Farms	151
Strengthening the Whole-Farm Planning Process through Producer-Agent Partnerships and Professional Development	153
Linking Farming Systems Research (FSR) with Holistic Resource Management (HRM)	153
Sustainable Agriculture Training Project for North Dakota and South Dakota	154
Decision Cases for Sustainable Agriculture: A Video Training Project for Professional Development	154
Organic Production and Marketing Curriculum for Extension Professional Development (Merits and Adoptability of Organic Agriculture)	155
In-Service Training in Sustainable Agriculture and Agricultural Ecology for NRCS Personnel and Partners	155
Utilizing the Concept of Whole-Farm Planning to Educate Agricultural Professionals and Farm Families in Ohio about Sustainable Agriculture	156
Participatory Learning between Farms and Field Crop Area of Expertise Team Members	156
Accessing Community-Based Information Sources for Improving Surface Water Quality	157

PDP Introduction **George W. Bird, Coordinator**

The North Central Region SARE Professional Development Program (PDP) completed its third year in 1996. Our goal is to develop and implement educational programs for Extension and NRCS staff and others in sustainable agriculture concepts, systems and practices. The PDP consists of a region-wide training project and 19 competitively awarded education projects, all of which are presented in this Annual Report: (1) FY94-funded region-wide training initiative, (1) FY94-funded two-state project, (8) FY95-funded projects, and (10) FY96-funded projects. The PDP also supports 12 North Central Region sustainable agriculture state strategic plans. I believe significant progress was made during the first three years of the PDP program.

- The region-wide North Central Sustainable Agriculture Training Project (NCSATP), under the leadership of the University of Nebraska and Ohio State University, was awarded \$410,000 FY94 through FY96. All 12 states have participated in the NCSATP. Considered the PDP's "Flagship," it provides a common educational experience through workshops that include farm tours and other significant farmer participation. (See pages 138 and 139).
- We received 65 PDP proposals FY94 through FY96 (13 in FY94, 24 in FY95 and 28 in FY96). Nineteen were funded on a competitive basis, receiving a total of \$917,305 (\$122,000 in FY94, \$395,305 in FY95 and \$400,000 in FY96). All the projects approved in FY94 and FY95 were active in 1996, and most involved more than one state. (See pages 140 through 157).
- All 12 North Central Region states and 13 Extension Services have PDP coordinators who completed sustainable agriculture strategic plans in 1995 and initiated them in 1996. Each Extension Service has been awarded \$38,250 (\$15,000 in FY94, \$12,000 in FY95 and \$11,250 in FY96) to assist with this process. (See pages 158 through 176).
- Additional details can be obtained by contacting Project/State Coordinators listed in each summary.



North Central Sustainable Agriculture Training Project

Project Coordinators:

Chuck Francis
Center for Integrated
Agricultural Systems
225 Keim Hall
University of Nebraska (UNL)
Lincoln, NE 68583-0949
402-472-1581
402-472-4104 (fax)
csas002@unlvm.unl.edu

Clive Edwards
Ohio State University
1735 Neil Ave.
Columbus, OH 43210
614-292-3786
614-292-2180 (fax)
soilecol@osu.edu

Team Members:

Heidi Carter
Education Coordinator
UNL

Barbara Vining
NRCS

George Enlow
Lincoln University

Funding:
SARE: \$262,989

Duration:
September 1994 - December 1996

To spread the awareness and knowledge about sustainable concepts and practices gained from SARE projects, Congress began appropriating funds for professional development for Extension personnel and other agricultural specialists in 1994. The North Central Region SARE Administrative Council awarded a region-wide development project under the joint leadership of Charles Francis, University of Nebraska-Lincoln and Clive Edwards, Ohio State University. The goals of the North Central Sustainable Agriculture Training Program (NCSATP) are: 1) to develop and implement a comprehensive education program for use throughout the region; and 2) to prepare a cadre of teachers to conduct innovative training in their own states.

To date, NCSATP has sponsored a planning meeting, four train-the-trainer workshops, and two year-end planning and review meetings. The total number of participants at meetings and workshops was 412: Extension (64 percent), farmers and ranchers (15 percent), nonprofit organizations (11 percent), and federal and state agencies (10 percent). Besides training events, NCSATP personnel administered minigrants, wrote and distributed educational materials, gave presentations, and networked with individuals interested in sustainable agriculture education.

Two guiding principles emerged from the first planning meeting held in January 1995: 1) sustainable agriculture must be viewed in a complex framework of social, economic, and environmental factors; and 2) training must be inclusive, both in terms of trainers and audience. Invited presentations were supplemented by those of key farmers and other workshop participants and Extension educators who had successful and unique projects.

Also based on participants' comments, workshops were not held on university or college campuses. People wanted a site away from distractions and one that would show an application of concepts, such as on farms or near conservation projects. Workshops were cosponsored by state teams in Illinois, Indiana, Iowa, Nebraska, North Dakota, and Wisconsin. Agendas have always included touring farms or research stations and learning from producers. For instance, farmers have designed discussions, prepared decision cases, and led pasture walks.

To reflect the need for a high degree of participation by everyone involved in education and training for sustainable agriculture, the title "Everyone a Teacher, Everyone a Learner" was chosen. Workshops explored economic, social, and environmental aspects of sustainable agriculture, using a wide variety of learning methods and evaluation techniques. Examples of subjects are Definition of Sustainable Agriculture, Social Issues Related to Agriculture,

continued ...



North Central Sustainable Agriculture Training Project

continued ...

Integrated Crop and Animal Systems, and Decision Case Studies.

At the 1995 Planning and Review Meeting, participants identified coalition building, facilitation skills, and political and environmental issues as key elements needed in future workshops. Based on these comments, the theme for the 1996 workshops was "Shared Leadership, Shared Responsibility." Since an entire day was spent on training in transformational leadership, concurrent sessions were run on two afternoons. Most of the topics had been recommended at the planning meeting, such as Approaches to Whole-Farm Planning, Financial Analysis for Sustainable Agriculture, and Using Study Circles in Sustainable Agriculture Training.

From numerous evaluations, one of the most constructive benefits has been the opportunity for state trainers, planners, and educators to network and share ideas and materials from various programs. The workshops instilled a sense of community and "recharged batteries" for those participants who feel isolated in their daily work environments. Besides the interaction, workshop attendees have developed contacts and in a sense, an informal speakers' bureau for their states' training functions. Many have also duplicated chapters from the resource notebooks and used the Participants' Lists to stay in touch.

Each year we have announced a call for proposals under the NCSATP grant for two minigrant activities: Special Topic Training Tours and Speakers for In-State Sustainable Agriculture Training. These activities were identified in the grant and given high priority by participants at the review meetings.

The Special Topic Training Tours emphasize the site-specific nature of sustainable agriculture practices as well as the broad applicability of principles. They also teach future trainers how to conduct lively and informative field trips. The Speakers for In-State Sustainable Agriculture Training provide expertise on specific topics in the implementation of state plans. Experts also share ideas and resources from other programs.

Six states requested funds for a total of seven tours and 20 speakers. Principal investigators were required to submit a report that included quantitative and qualitative evaluations and suggestions for other trainers. Many educators stated the minigrant program was important because it provided programming opportunities they could not have afforded otherwise.

The role of NCSATP as a clearing house for sustainable agriculture education continues to grow. More than 1,300 copies of grant-derived educational materials were distributed throughout the United States and to 13 other countries. We also prepared newsletter articles, handouts, and chapters on Professional Development Program issues. Besides written materials, we promoted the subject of sustainable agriculture through presentations, classes, and talks to other groups. Since networking is vital to building and maintaining partnerships, we have interacted with a cross section of people involved in agriculture.

NCSATP has been a valuable and highly visible project in the North Central Region. It has provided ongoing focus, and we are beginning to see the impacts in state orientation of Professional Development Programs. We can summarize the impact with one quote: "Teaching sustainable agriculture is critical. We shouldn't give up. When you're sick and tired of your logo, people are just beginning to pick it up." (Illinois Extension Educator)



North Dakota/South Dakota Professional Development Project

Project Coordinators:

Darnell Lundstrom
North Dakota State University
Extension Service
P.O. Box 5437
Fargo, ND 58105-5437
701-213-7173
701-213-8378 (fax)
agnrdir@ndsuent.nodak.edu

Larry Tideman
South Dakota State University
Extension Service
152 Ag Hall
Brookings, SD 57006
605-688-4147
605-688-6347 (fax)
tidemanl@mg.sdstate.edu

Funding:

SARE: \$122,000

Duration:

1994 - 1996

Activities in 1995 as previously reported included participation in regional planning and training workshops, participation with the Northern Plains Sustainable Agriculture Society's summer tour and winter meeting, and the first year of the Sustainable Agriculture Training for Extension, NRCS and others.

Participation in the North Central Sustainable Agriculture Planning Workshop, held at Allerton Farm near Monticello, Ill., occurred in February 1996. The training coordinator, nonprofit representative, and two county agents providing extensive sustainable agriculture programming and also participated in a Train-the-Trainer Workshop in July at Carrington, N.D.

Extension staff continued to be involved with the programs conducted by the Manitoba-North Dakota Zero Till Association and the Northern Plains Sustainable Agriculture Society. A tour of North Dakota Extension agents and research center staff went to South Dakota in August. They toured the nationally acclaimed Mortenson ranch near Pierre where the Holistic Resource Management decision-making model is employed. The Dakota Lakes Research Farm near Pierre was also visited, where no-till research is conducted by Duane Beck of SDSU. The farm, however, is owned and governed by a board of farmers. Those participating gave very favorable evaluations of this tour. The tour was made possible by an out-of-state tour grant given by the North Central Regional Center at Lincoln, Neb.

Two-day training sessions were held in Dickinson and Carrington, N.D., and Pierre and Brookings, S.D. These training sessions covered topics that had not been covered in 1995, especially dealing with livestock and crops integration and value-added ventures including cooperative development. The training also built on the training received in 1995. Staff from NDSU, SDSU, NRCS at Bozeman, Mont., University of Minnesota, the Council for Cooperative Development, and the Burdick Center for Cooperatives were utilized as instructors. Producers involved in developing coops or recently formed coops gave insight to the process. Discussion regarding large hog developments and cooperative development was especially extensive.

Evaluations received indicated an appreciation for the training given but also a need and want for additional training in the future. Outcomes from the two years of training and activities include 50 percent of North Dakota agriculture agents plan of work having a sustainable agriculture component or components of the sustainable agriculture training received. In SDSU program planning, five of 11 major program issue areas reflect sustainable agriculture. These were submitted by county staff. Both states have offered highly popular minigrant programs.



Experiential Co-Learning for Professional Development in Sustainable Agriculture

Project Coordinator:
Craig Dobbins
Purdue University
1145 Krannert Bldg.
Department of Ag Economics
W. Lafayette, IN 47907-1145
317-494 9041
317-494 9176 (fax)
dobbins@agecon.purdue.edu

Team Members:
PURDUE:
David Petritz
Extension Program Director

Keith Johnson
Extension Specialist
Forage Production

David Swaim
Independent Crop Consultant

University of Illinois (UI):
Ed Ballard
Extension Specialist
Forage Production

Deborah Cavanaugh-Grant
Extension
Illinois Sustainable
Agriculture Network

Dan Anderson
Extension

OTHER:
Steve Bonney
President
Indiana Sustainable
Agriculture Association

Ed Heckman
Extension Educator

Barb Vining
Nutrient and Pest
Management Specialist
NRCS

Tom Benjamin
Soil and Water Conservation Service

Funding:
SARE: \$60,040
Match: \$78,823

Duration:
September 1995 - August 1997

This multi-professional, interdisciplinary educational project to be conducted as a prototype in Indiana and Illinois will help agricultural researchers, extension educators and other advisors evaluate practices and systems from the viewpoint of the farmer. It will also help farmers learn more about the technical approach of researchers and specialists. Innovative farmers, NRCS personnel, and university-based extension specialists, and researchers and county educators are to be formed into interest area teams. These teams will study how innovative production practices that will increase the sustainability of farms can be successfully implemented.

On Jan. 22, 1996, 37 individuals from Indiana and 13 from Illinois met at the Beef House at Covington, Ind., for an all-day kickoff meeting. The group was divided into five study areas focused on one of the following topics: Soil Improvement and Crop Management; Alternatives in Crop Protection; Intensive Rotational Grazing; Design and Management of Borderlands; and Innovative Business Marketing.

After discussing the environmental, economic, and social challenges they faced and some of their informational needs, each group offered suggestions for a series of summer tours. The Crops and Soils Group and the Crop Protection Group each decided to visit farms and research sites in Illinois. The Grazing, Borderlands and Business Groups arranged separate tours in Indiana. From 10 - 20 individuals participated in each of the tours.

Practices introduced on the Crops and Soils Group included ridge-till and mechanical weed control, alternating strips and alternating rows of corn and soybeans, techniques for measuring soil quality, equipment for monitoring contamination of tile water, prairie restoration, and comparison of organic versus no-till versus mulch till production systems.

The Crop Protection Tour Group viewed a comparison of reduced nitrogen rates, plus a comparison of a corn borer resistant variety with a Bt gene and the original parent line. They also viewed filter strips along ditch banks, parasitic wasps for controlling corn borer, imported beetles for biological control of purple leaf stripe, and methods for trapping and monitoring corn rootworm beetles feeding in soybeans. The group discussed the increasing need for insecticide treatment on first year corn and the potential of improving habitat for bio-controlled organisms.

continued ...



Experiential Co-Learning for Professional Development in Sustainable Agriculture

continued ...

The Grazing Tour Group learned more about the use of intensive rotational grazing of dairy and beef, the value of indigenous warm-season grasses, advancements in watering, fencing and construction of laneways, use of double-crop milo, soybeans and field peas, the potential of double-crop millet, and converting old hog buildings and gravel pits to aquaculture.

The Borderlands Tour Group visited the Throckmorton Purdue Ag Center to inspect a wide variety of windbreaks, shelterbelts and filterstrips, each including several diverse plant species. The group then traveled to a farm to see mixtures of forbes and native grasses planted for game bird habitat and switch grass planted in riparian zones for both habitat and water quality. At another farm they toured over 100 acres of alley cropping of soybeans between rows of walnut seedlings plus demonstrations of different approaches to timber stand improvement. At the Purdue Forestry Center they inspected an automated water quality station and discussed how fencing and strategic location of crushed stone can protect the quality of streams in grazing areas.

The Business Tour Group visited with a farmer involved in environmental assessment and holistic resource management. The group discussed the challenges facing medium-scale cash grain farming operations. They discussed on-farm research and water quality enhancement projects and progress on the farm. They then visited a grain company to discuss the marketing of specialty grains and strategies for accessing premium foreign markets. An on-farm oilseed processing plant was visited and the process of developing value-added products was discussed. The group also visited with the organizer of a new-generation cooperative for swine marketing.

On Feb. 6, 1997 a follow-up meeting was held at the Beef House in Covington, Ind., with 32 attendees. Each study group met to assess further information needs and what they would like to investigate in a second round of tours. This was followed by slide presentations and discussions highlighting each summer tour, and emphasizing the most applicable concepts observed.



Increasing Trainer Literacy in Sustainable Agriculture

Project Coordinator:
Charles A. Francis
Center for Sustainable
Agricultural Systems
225 Keim Hall
University of Nebraska
Lincoln, NE 68583-0949
402-472-1581
402-472-4104 (fax)
csas002@unlvm.unl.edu

Team Members:
Jim Bender
Farmer

Gabriel Hegyes
Keiser College

About 35 Reviewers Nationwide

Funding:
SARE: \$10,000

Duration:
October 1995 - September 1997

This project includes an in-depth reading, study, and discussion of one key book on whole-farm planning from a farmer's perspective, and a region-wide live satellite interview with the author. It also includes a review of 100 of the most relevant books and other resources that can contribute to understanding and teaching about the basis for future agricultural systems. This compendium of individual reviews will be published and distributed throughout the region and the U.S., as well as be made available through the Center for Sustainable Agricultural System's web site. The filming, interview, and national broadcast have been completed, and the reviews are currently being edited for publication.

We announced in October 1995 that the Bender book was available at a special price for Extension and NRCS personnel, finished filming at the Bender farm in December, and had a two-hour national satellite broadcast interview in January 1996 that was uplinked from Lincoln. We estimate that about 250 people viewed this program, which was advertised across the U.S. There were phone-in and fax-in questions during the broadcast from Michigan, Minnesota, Wisconsin, Kansas, Iowa, Manitoba, and Moldova, with inquiries to Bender about the details of his farming operations and about his philosophy of organic agriculture. We distributed over 250 books to interested trainers in the region, and have feedback from local discussion groups in several sites. Twenty copies of the tape of the two-hour interview have been distributed on request. A more in-depth evaluation of impact will come from a mail survey of the participants.

Titles of books were sent to over 60 potential reviewers for the compendium of recent literature on sustainable agriculture. Of these, 30 responded with willingness to review one or more of the books, or provided permission to reprint a review that had already appeared in print in another publication. We have now received permission to reprint all of the reviews from journals, as well as written agreement to include some more in-depth essays and bibliographies to make the book a more complete resource for educators and trainers in the North Central Region and around the country. We are awaiting several of the final reviews, and the publication is currently in the editing and formatting stage. It should be completed by March 1997, and a minimum of 300 copies will be distributed to interested educators around the region. This will be evaluated using a tear out page in the book that will be sent back to the editors.



Grazing Systems for Sustainable and Profitable Agriculture

Project Coordinator:
Henry Bartholomew
150 N. Homer Ave.
Logan, OH 43138
614-385-3222
614-385-6572 (fax)
bartholomew.2@osu.edu

Team Members:
Jim Gerrish

Rich Leep

Mark L. Bennett

Stephen Boyles

Daryl Clark

James C. Clay

Jack Cline

Rick Duff

Jeff Fisher

Robert Hendershot

Richard Jeffers

Lloyd Owen

R. Mark Sulc

Edward M. Vollborn

David Zartman

Funding:
SARE: \$92,100

Duration:
January 1996 - January 1998

The team members have revised and enhanced existing teaching materials used in the North Central Region for use in the region. Most teaching modules include a lesson plan, script and 35mm slide set composed of a combination of photos and Powerpoint slides on the topic. The scripts, handouts, and reference materials on each topic are provided to states requesting a reference notebook. Three day in-service workshops to introduce the subject matter and teaching materials are conducted in conjunction with the host state. Extension and Natural Resources Conservation Service employees have been the participants in the in-services. To date in-services have been held in Michigan (2), Missouri, Ohio, Indiana, and Illinois. Discussions are currently underway with Wisconsin, Iowa, and South Dakota for possible additional in-services.

The topics covered are: Management Intensive Grazing Concepts and Principles; Where Are You and Where Do You Want To Be; Evaluating Soils Resources for Grazing Systems; Matching Forage Species to your Environment and Livestock; Paddock Layout and Water System Design; Soil Fertility for Pastures; Understanding Plant Growth; Grazing Systems and the Environment; Meeting Animal Requirements on Pasture for Beef, Dairy, and Sheep; Experienced Graziers' Panel: How To Get Started, Economics of Grazing; Introduction to the Case Farm; Preparing Your Group's Plan of the Case Farm for Presentation; Group Presentations and Critique; and Evaluation of Instructors and Workshop.

The evaluations are very positive with the producer panelist consistently rating the highest marks. Support to the host state from grant funds includes: honorarium for farmers serving as instructors, reference notebook, travel for instructors, and three complete sets of teaching materials.



A Comprehensive Educational Program for "Training the Trainers" in Sustainable Agriculture in Minnesota, Wisconsin, and Iowa

Project Coordinator:

Helene Murray
Minnesota Institute
for Sustainable Agriculture
411 Borlaug Hall
St. Paul, MN 55108-1273
612-625-0220
612-625-1268 (fax)
murra021@maroon.tc.umn.edu

Team Members:

George Boody
Land Stewardship Project

Jerry Doll
Wisconsin Extension Service

Tammy Dunrud
Program for Decision Cases

Rick Exner
Iowa State University
Practical Farmers of Iowa

Tom Frantzen
Farmer
Practical Farmers of Iowa

John Hall
Michael Fields Agricultural Institute

27 Other Cooperators

Funding:

SARE: \$108,905

Duration:

October 1995 - September 1997

The agreed upon, broad working goal of this proposal is to utilize the leadership that exists within the sustainable farming community to influence the future of agricultural, rural, and urban communities to achieve socially, environmentally, and economically sustainable farms and communities in Minnesota, Wisconsin, and Iowa.

To that end we have conducted or have planned several participatory training activities attended by extension agents and specialists, agency personnel, farmers, and other interested parties. Specifically, six decision case workshops on sustainable agriculture topics have been held in Minnesota, and one in Wisconsin. We have had 80 participants attend the trainings, representing Extension, NRCS, local and state water districts, and other related agencies; the evaluations have been very positive. We have plans for three more workshops this spring in Wisconsin and Iowa.

A three-state bus tour coordinated by the Iowa project participants in conjunction with participants from Wisconsin and Minnesota was held July 1-2, 1996. The tour was attended by 60 people who participated in facilitated discussions, informal networking and tours of three farms in Iowa, Wisconsin, and Minnesota. We are making plans for a similar bus tour to be held in Wisconsin this summer. The Wisconsin tour will focus on cropping systems, with an emphasis on systems analysis tools.



Building Collaboration Partnerships with Farming Systems Research and Extension

Project Coordinator:

Cornelia Flora
North Central Regional Center
for Rural Development
317 East Hall
Iowa State University
Ames, IA 50011
515-294-1329
515-294-2303 (fax)
cflora@iastate.edu

Team Members:

Leopold Center
for Sustainable Agriculture

Farm Foundation

W.K. Kellogg Foundation

Henry A. Wallace Institute
for Sustainable Agriculture

Funding:

SARE: \$20,680

Duration:

October 1995 - September 1997

The symposium on Linkages Among Farming Systems and Communities was conducted at the Scheman Continuing Education Building of Iowa State University Nov. 5 - 8, 1995. The major sponsor was the North American Association for Farming Systems Research/Extension (AFSR/E), while cosponsors included the North Central Regional Center for Rural Development, the Leopold Center for Sustainable Agriculture, the Farm Foundation, the W.K. Kellogg Foundation, the North Central Region SARE Program and the Henry A. Wallace Institute for Alternative Agriculture.

The major goal of the symposium was to enhance the development of sustainable farming systems and rural communities and quicken the pace of moving towards more sustainable systems by farmers and extension educators. The major objective was to bring together, through participatory methodologies, educators, researchers and producers to share their practices and enlighten each other on indispensable "success" skills they needed, including effective communications and collaboration skills. The attendance at the symposium cut across international boundaries, bringing together a total of 199 participants from the U.S., Canada, Mexico and Norway. Each of the 12 states in the North Central Region was represented by at least one farmer and one Extension staff person, while a good number of Natural Resources Conservation Service (NRCS) staff persons were also present.

Sustainable agricultural approaches discussed included: 1) The bio-regional approach adopted by the Netherlands government which provided farmers with a series of new farm management tools called "yardsticks," including alternative environmentally safe practices; 2) New York City's Watershed Agricultural Program which conducts research on water quality issues on selected demonstration farms with a view to insuring clean drinking water; and 3) A liberal approach to economic development in some Central and Eastern European countries. In Estonia, for example, the 1992 Law on Agricultural Reform required the replacement of large state-owned farms by smaller farmers' cooperatives, share holding companies and private farms. Similarly, Slovakia has a Land Reform Act privatizing state collective farms and restructuring agricultural production.

continued ...



Building Collaboration Partnerships with Farming Systems Research and Extension

continued ...

Sustainable agricultural systems discussed included: 1) Diversification of farming enterprises by small-scale farmers in the Potomac South Ranch Valley; 2) Swedish pig-friendly and sustainable Feeder Pig Production Model which laid emphasis on the safety and health of the animals and meat consumers through reduced use of antibiotics and other drugs in livestock feeds; 3) Fallow vegetation in tropical Mexico through shifting cultivation, allowing the recuperation of soil fertility during the fallow period and the controlled pasture grazing management system involving decision making on issues like production and grazing plan for forage crops, using grasses and legumes to maximize plant and animal productivity, and decreased use of inorganic fertilizers; 4) The Kellogg Biological Station in Michigan provided information on its integration of domestic birds into a non-chemical orchard and the elimination of pesticide use, growing of disease-resistant plant varieties and use of the orchard alleys for intercropping annuals. Vulnerability of young chickens and geese to predators is a major problem; 5) Rice-Fish Culture as an alternative to Rice Monoculture in a fragile ecosystem to reduce risks of ecological stress and crop failures, while providing reasonable guarantee for the welfare of farm families; 6) IAPDM or Integrated Approach to Pest and Disease Management in Farming Systems which combines practices like prophylaxis, sanitation, balanced nutrition and health care in a coordinated management system.

Other important issues included: 1) the need to remove socioeconomic and cultural barriers that hinder active recognition and participation of women in sustainable agriculture worldwide; 2) acquisition and use of information for decision-making by small organic farmers; 3) the role of technology; 4) safety; and 5) evaluation of sustainable practices.

Feedback communications received from participants suggested the inclusion of educative foreign training materials, resource personnel and some opposing views in future training programs, as well as extending invitations to bankers, policy makers and financial institutions. Active involvement of everybody and pre-symposium farm tours were also advised.

NAFSNET: A participant gave a progress report on the proposed establishment of an electronic network of participants, including the installation of an 800 number to ensure the connection of producers at affordable costs. The above exposition clearly accorded high ratings to the planning, organization and execution of all aspects of the symposium. The organizers deserve praise for a job well done because all eight objectives they started with were addressed. However, it may take some time to see the outcomes of some of them, such as the participants becoming effective change agents. Also, careful note should be taken of the critical issues raised in the symposium and due considerations given to them in the planning of future training sessions. The suggestions and recommendations of the participants, as well as the concerns and interests of all stakeholders in sustainable agriculture and education should also be sought and integrated within future training curriculum. Finally, active involvement and participation of all stakeholders from planning through organization, execution and evaluation of training programs is a crucial condition for successful advancement and spread of sustainable agricultural practices by farmers.



Life after CRP

Project Coordinator:
Peter Buessler
Minnesota Department
of Natural Resources
1221 E. Fir Ave.
Fergus Falls, MN 56537
218-739-7497
218-739-7601 (fax)
pbuessl@fergus.cfa.org

Team Members:
Steve Taff
Department of Applied Economics
University of Minnesota

Mary Hanks
Minnesota Department of Agriculture

Jay Leitch
Department of
Agricultural Economics
North Dakota State University

Funding:
SARE: \$30,000

Duration
October 1995 - June 1997

AGLAND: THE GAME™ is a group simulation activity for learning about agricultural land-use issues. It can help local or state planning boards, conservation districts, town councils, students, and other groups learn about agricultural land-use issues. In this game, participants will play through 20 years of farming and policy making and experience the economic, environmental and social consequences of their decisions through the two decades.

By taking on the role of farmer or policy maker, participants learn about how the real-world system operates – and experience the trade-offs involved in decision-making within that system. Following the game, a “debriefing” provides opportunity for group discussion about: problems, events and factors that were responsible for them; the extent to which these occur in real life; changes that could have been made in the simulation, and real-life, which could avoid or solve the problems; and gaining commitment from the players that they will seek to achieve the necessary changes in the real system.

AgLand is a region with farms, rivers, a town, wetlands, and wildlife. Farmers make decisions about crops to plant, livestock, conservation practices, and participation in government programs. Policy makers can decide to offer incentives, levy taxes, and impose regulations to achieve economic, environmental and social goals. Although farmers and the policy council can influence each other's success, a significant portion of the success of both depends on two factors over which neither has any control – crop prices and the weather.

Simulation is a powerful method for dealing with complex and ambiguous issues. It is based on system dynamics modeling methodology, developed at MIT, which shows how future decisions are influenced by today's actions. Simulation tools can improve analysis and decision-making by: improving the ability of participants to understand the consequences of their choices; identifying both strengths and weaknesses of strategic options under consideration; challenging status quo assumptions held by decision-makers and decision-influencers; providing a nonthreatening forum for discussion and issue resolution; helping to develop comprehensive strategies and policies that meet the organization's or public's objectives in a variety of future scenarios; and developing and communicating analyses that include the perspectives of all participants, showing consistencies and inconsistencies among a variety of viewpoints.



Local Sustainable Agriculture Team Building: A Sustainable Agriculture Training Model

Project Coordinator:

Russ LaRowe
Executive Director
Michigan Agricultural
Stewardship Association (MASA)
605 N. Birch St.
Kalkaska, MI 49646
616-258-3305
616-258-3318 (fax)
Kswcd@aol.com

Team Members:

Huron County Innovative Farmers

Joyce Muz
Water Quality Agricultural Agent

Natalie Rector
Extension Agent
Agriculture and Natural Resources

Dan Rossman
Extension Agent
Agriculture and Natural Resources

Steve Poindexter
Extension Agent
Agriculture and Natural Resources

Carrie Andrich
Extension Specialist

Harold Rouget
Coordinator
Extension Agent
Agriculture and Natural Resources

Funding:
SARE: \$30,000

The Michigan Team consisted of agricultural agents, NRCS field personnel, and professional farmers. There were actually two teams working concurrently with funding from North Central Region SARE, local funds, and Great Lakes Protection Fund monies. Farmers, ag agents, and NRCS personnel experientially learning sustainable farm management proved an exciting education format.

Many nonconventional sources were used as educational tools. Teams learned Holistic Resource Management and spent several days learning "community" from the Amish in central Ohio. The second team consisted of 36 equipment dealers, technicians, ag agents and farmers enrolled in several learning opportunities, including a trip to Ontario, Canada to visit several innovative farming and farm produce processing facilities. The three-day tour culminated with a visit to the Ontario Outdoor Machinery Show, including a stop and discussion on alternative crops.

The team approach allows reciprocal discussion and an "everyone a teacher, everyone a learner" attitude by the participants. This approach would work well in any learning situation, but seems especially useful in furthering sustainable agriculture education.



Quality of Life Module for Extension Professional Development

Project Coordinator:

Elizabeth Ann R. Bird
Consortium for Sustainable
Agriculture Research and Education
1450 Linden Drive, Room 146
University of Wisconsin (UWM)
Madison, WI 53706
608-265-6483
608-265-3020 (fax)
eabird@facstaff.wisc.edu

Team Members:

UWM:
Frederick H. Buttel
Program on Agricultural
Technology Studies

Douglas B. Johnson
Program on Agricultural
Technology Studies

Jessica Goldberger
Rural Sociology Department

Funding:

SARE: \$38,580

Duration:

October 1995 - September 1997

There was little progress in 1996 due to staffing difficulties. Module outline bibliography was completed.

In 1997, the team: 1) Continued bibliographic research and summaries of literature relating to agriculture and quality of life; 2) Constructed a framework for multiple situationally adaptable modules. Project cooperators around the region will contribute whole modules or pieces thereof; 3) Created one introductory module ("Our Life" Simulation); 4) Planned for additional modules: Role of the Changing Structure of Agriculture in Quality of Rural Community Life; Role of Technological Change in Quality of Rural Community Life; Technology Choice and Quality of Life on the Farm; and Integrating Quality of Life into Whole-Farm Planning; 5) Planned for possible additional modules: Market Options for Quality of Life; Food Security and Food Policy Councils; Grassroots Networks for Appropriate Technology and Community Development; Case Studies in Quality of Life Whole-Farm Planning; Mobilizing Resources for Whole-Farm Planning – Institutional and Policy Change; and Building Social Capital.



Sustaining a Desirable Quality of Life through New Agricultural Opportunities for Farm Families on Small Farms

Project Coordinators:

John Ikerd
University of Missouri
Agricultural Economics
200 Mumford Hall
Columbia, MO 65211
573-882-4635
573-884-6572 (fax)
ssikerd@muccmail.missouri.edu

Dyremple Marsh
Lincoln University
106 Allen Hall
Jefferson City, MO 65102-0029
573-681-5531
573-681-5548 (fax)

Funding:

SARE: \$30,000

The overall goal of this program is to enhance the ability of extension agents and other information providers to reach traditionally underserved farm families on small farms with sustainable agriculture information and educational programs. The specific objective of the activities funded by this particular project was: To increase awareness among extension workers and other information providers of information delivery methods and new opportunities for enhancing the economic viability of small farms by focusing on ecologically sound and socially responsible farming and marketing alternatives which fit well with small, family farming operations.

A comprehensive professional development experience was produced and conducted in conjunction with the 1996 national *Small Farm Today* Seminar and Trade Show in Columbia, Mo. The *Small Farm Today* (SFT) Seminar and Trade Show is an annual event sponsored by the *Small Farm Today* magazine and is held in Columbia, Mo., each November. Seminars included such nationally known speakers as Joel Salatin and Andy Lee. However, most speakers were just plain small farmers who are making their systems work. The 1996 seminar and trade show was attended by approximately 2,200 people from more than 20 different states.

A special Professional Development Program (PDP) workshop, preceding the opening day of the SFT seminar and trade show, addressed the basic concepts of: 1) sustainable niche production and marketing; 2) holistic, principle-based planning and management approaches to working with small farm families; and 3) growing strong, productive farm families – substituting family teamwork and thoughtful management for machinery, inputs, land, and capital. The preconference workshop included presentations by Joel Salatin and Andy Lee and a panel of four Missouri farmers – all addressing the question of how extension workers can best support small farms.

Small groups of workshop participants were given team assignments based on case studies representing different small farm situations. The assignment included: 1) listening to seminar speakers, talking with trade show exhibitors, and asking questions; 2) making individual and collaborative assessments of the economic, ecological, and social sustainability implications of different ideas, enterprises, methods, or products at the seminar and trade show; and 3) developing a team report concerning new opportunities they discovered for the families on their case study farms.

continued ...



Sustaining a Desirable Quality of Life through New Agricultural Opportunities for Farm Families on Small Farms

continued ...

Each team included two or more Small Farm Family Educational Assistants and at least one Extension Specialist, and each team was as diverse as possible with respect to home-state, farmer/non-farmer, and specialization by discipline, commodity, or type of farming. The presence of SFFP Educational Assistants on each team helped create a co-learning situation between those with stronger backgrounds in sustainable agriculture and those with more experience in addressing the unique information and educational needs of small farm families.

A total of 54 people from eight different states attended the PDP preconference. Verbal evaluations were solicited at the end of the program, and written evaluations were mailed and returned by participants two months later. Evaluations were very positive with many good comments concerning specific aspects of the programs that "should not be changed," but with a few good suggestions that should make a planned 1997 PDP even better.

In the written evaluation, participants were asked to rank on a scale of 1 to 10 (10 being highest): 1) what they gained in understanding and knowledge; and 2) the usefulness of what they learned in carrying out their work back home. The average rating for understanding and knowledge was 8.5 and the rating for usefulness was 8.8.

The program will also be evaluated by a follow-up survey of Missouri educational assistants and regional specialists. A determination will be made as to how many more SFFP agents are providing specific sustainable agricultural information and teaching sustainable agriculture concepts to their small farm families and how many regional specialists have found ways to reach more small farm families through sustainable agricultural programs.



Strengthening the Whole-Farm Planning Process through Producer-Agent Partnerships and Professional Development

Project Coordinator:
Cris Carusi
Nebraska Sustainable
Agriculture Society
P.O. Box 736
Hartington, NE 68739
402-254-2289
402-254-6891 (fax)
cecarusi@hartel.net

Funding:
SARE: \$75,000

Producers will implement whole-farm plans built upon their personal goals for their farms, families, and communities. Goal-based planning is important for the success of the Natural Resources Conservation Service's whole-farm and -ranch planning pilot projects in Minnesota and Nebraska. This program will train NRCS, Cooperative Extension and producer participants to use a site-specific, goal-oriented planning model to develop and evaluate whole-farm plans, and to use decision case studies as a teaching and learning tool for whole-farm planning. Learning alongside one another, producers and agency representatives will have many opportunities to understand one another's perspectives and to strengthen communication.

Linking Farming Systems Research (FSR) with Holistic Resource Management (HRM)

Project Coordinator:
Craig Dobbins
Purdue University
1145 Krannert Bldg.
Department of
Agricultural Economics
West Lafayette, IN 47907-1145
317-494-9041
317-494-9176 (fax)
dobbins@agecon.purdue.edu

Funding:
SARE: \$5,000

This project entails a planning grant to develop a project designed to: link whole-farm planning with the design of systems research to improve the quality of whole-farm planning in Indiana, promote more local input into research at Purdue Ag Centers and begin to tap the potential of integrated farming systems. It will begin with a three-day workshop introducing Holistic Resource Management (HRM), followed by a one-day workshop introducing Farming Systems Research (FSR). Each workshop will require follow-up. Participants will become familiar with the basics of HRM and FSR. To encourage the implementation of HRM plans and identify and prioritize needed research, the farmers will be teamed with a facilitator to form an "innovators' round table," augmented by a variety of educators and addressing farmers' questions on new resource management systems. During the second summer, extension and district conservationists will give area wide tours to demonstrate functional alternative management concept.



Sustainable Agriculture Training Project for North Dakota and South Dakota

Project Coordinator:
Darnell Lundstrom
North Dakota State University
Extension Service
P.O. Box 5437
Fargo, ND 58105-5437
701-231-7173
701-231-8378 (fax)
agnrdir@ndsuent.nodak.edu

Funding:
SARE: \$32,044

In-depth training on sustainable agriculture techniques and systems will be conducted in North Dakota and South Dakota for extension specialists and agents, federal and state agency personnel and interested persons. This one-year project will build upon the sustainable agriculture training previously received by these people. On-farm, hands-on workshops utilizing the farmer and extension-researcher expertise will combine to provide an overall view of the farming system employed with insight to the integration of all farm enterprises. Appropriate printed material will be developed to supplement the training. The training program will be planned and coordinated with the regional Chapter 3 training coordinators and the organizational partners.

Decision Cases for Sustainable Agriculture: A Video Training Project for Professional Development

Project Coordinators:
Helene Murray and Tammy Dunrud
Minnesota Institute
for Sustainable Agriculture
University of Minnesota
411 Borlaug Hall
St. Paul, MN 55108-1273
612-625-0220
612-625-1268 (fax)
murra021@maroon.tc.umn.edu

Funding:
SARE: \$52,380

A professional development training package including two videos and supporting educational materials will be produced and disseminated within the North Central Region to the Cooperative Extension Service and the Natural Resources Conservation Service. The program will focus on decision case methodology as it relates to farming systems projects in sustainable agriculture. Overall coordination of the program will be a joint effort of the Minnesota Institute for Sustainable Agriculture and the University of Minnesota's Program for Decision Cases. The process of program development will include: state and county faculty representing the Minnesota Extension Service, NRCS personnel and the Sustainable Farming Association of Minnesota's 11 chapters. Others representing these same agencies from Iowa, Wisconsin, and Nebraska will be asked to review the materials as well. This package will also be available as a training option for other programs.



Organic Production and Marketing Curriculum for Extension Professional Development (Merits and Adoptability of Organic Agriculture)

Project Coordinator:
Jim Arts
Cooperative Development
Services Fund
30 West Mifflin, Suite 401
Madison, WI 53703
608-258-4396
608-258-4394 (fax)
egnadeau@facstaff.wisc.edu

Funding:
SARE: \$76,120

The purpose of this project is to develop, implement and evaluate a curriculum covering the principles and practices of organic production and marketing in the North Central Region. Organic agriculture is growing in consumer demand and sales, but there are gaps in the training materials needed to inform farmers and those who assist farmers of the principles and practices of organic agriculture. The project will develop a curriculum necessary to fill this gap, by adapting existing resources and designing new materials where necessary. Then the project will conduct training sessions in the six participating states (Michigan, Wisconsin, Iowa, Minnesota, North Dakota, and South Dakota) and publish and publicize the curriculum to make it widely available.

In-Service Training in Sustainable Agriculture and Agricultural Ecology for NRCS Personnel and Partners

Project Coordinator:
Lawrence E. Dyer
Natural Resources
Conservation Service
Michigan State Office, Room 101
1405 S. Harrison Road
East Lansing, MI 48823-5243
517-337-6701
517-337-6905 (fax)
dyerlawr@pilot.msu.edu

Funding:
SARE: \$30,000

We will conduct in-service training for NRCS personnel and partners to enhance the understanding of agricultural ecology concepts, and the application of those concepts to agriculture. Watershed teams in NRCS will serve as the infrastructure for coordinating training, which will be done in collaboration with Michigan State University Extension (MSUE) and the Michigan Agricultural Stewardship Alliance (MASA). Training will center around on-farm demonstration and research projects, selected to illustrate ecological principles. Concepts will be developed further in classroom sessions. The curriculum will use modules developed in the Michigan SARE Professional Development Program. Written educational materials will be placed in the sustainable agriculture lending library being managed by MSUE.



Utilizing the Concept of Whole-Farm Planning to Educate Agricultural Professionals and Farm Families in Ohio about Sustainable Agriculture

Project Coordinators:
Mike Hogan and Mark Bennett
Ohio State University Extension
Courthouse
119 Public Square
Carrollton, OH 44615-1498
330-627-4310
330-627-6656 (fax)
hogan.1@osu.edu

Funding:
SARE: \$32,000

The proposed training project will provide agricultural professionals and farm families in Ohio with an understanding of whole-farm planning as it relates to specific local issues. The goal is to help farm families learn how to develop whole-farm plans which balance production and quality of life with sustained resource use. Such plans would help farm families implement environmentally sound practices, maintain or expand profitability, and improve quality of life. The target audience for this program: Extension (agriculture, community development, family and consumer science); NRCS; professionals from state agencies (Ohio EPA, Ohio Department of Agriculture, Ohio Department of Natural Resources, Soil and Water Conservation Districts); leaders of commodity organizations (Ohio Cattlemen's Association, Ohio Pork Producers' Council, Ohio Vegetable Growers, etc.); leaders of sustainable agriculture groups (Innovative Farmers of Ohio and Ohio Ecological Farm and Food Association) and farmer member organizations (Ohio Farm Bureau and Ohio Farmers' Union).

Participatory Learning between Farms and Field Crop Area of Expertise Team Members

Project Coordinator:
Natalie Rector
Michigan State University Extension
Calhoun County
315 W. Green St.
Marshall, MI 49068
616-781-0784
615-781-0647 (fax)
rector@msue.msu.edu

Funding:
SARE: \$48,200

Learning occurs when people become immersed in a meaningful experience based on a real problem (Gerber 1992). Twenty-four Extension agents and 16 campus faculty comprise the Michigan State University Field Crops Area of Expertise (AOE) team. These agents will create self-directed learning teams with farmers and other local partners for the advancement of sustainable agricultural systems. With virtually no overhead cost, monies will be available for county teams to learn, experiment, and network in their pursuit of sustainable systems. Projects will include organic production systems, cover crops to reduce or eliminate herbicides, nutrient recycling, and local collaborative efforts. On-farm demonstration and self-directed learning activities will meet local needs. The AOE team provides a statewide audience, including other agencies, campus faculty, and farmers. Results will include increased technical capacity of the local team members, evidence of teaching others and increased networking among knowledgeable leaders for sustainable agriculture.



Accessing Community-Based Information Sources for Improving Surface Water Quality

Project Coordinator:
Rich Bowman
Water Resources Institute
Grand Valley State University
118 Padnos Hall of Science
One Campus Drive
Allendale, MI 49401
616-895-3749
616-895-3864 (fax)
wardr@gvsu.edu

Funding:
SARE: \$14,300

The western Michigan surface water quality self-assessment training program will enable Extension, NRCS, and other personnel to assist agricultural producers to: analyze the impact of their practices on surface water quality, establish surface water quality objectives, and implement specific sustainable practices to achieve those objectives. The target personnel will receive training in surface water quality from a coalition of west Michigan community members. The training will include laboratory and farm work, classroom training, and an introduction to community-based information resources which can be accessed after the training program is complete. The program will be a model which other communities may emulate and could potentially serve as a component of a whole-farm planning system.



State Reports

Illinois	159
Indiana	161
Iowa	162
Kansas	163
Michigan	164
Minnesota	166
Missouri	167
Nebraska	169
North Dakota	171
Ohio	172
South Dakota	174
Wisconsin	175



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Illinois

Strategic planning efforts in Illinois are conducted by the Chapter 3 Planning Committee. This 28-member Committee includes farmer representatives from regional and statewide sustainable agriculture organizations; CES educators, unit leaders and administrators; and NRCS, Illinois Department of Agriculture and Soil and Water Conservation District personnel. The Chapter 3 Planning Committee provides guidance and support for our statewide planning efforts. The activities in 1996 have focused primarily in four areas: 1) study circles, 2) Agroecology/Sustainable Agriculture Homepage, 3) leadership and participation in the Purdue University Chapter 3 project Experiential Co-Learning for Professional Development in Sustainable Agriculture and Holistic Resource Management (HRM) training.

The primary focus of the Chapter 3 efforts in Illinois has been to provide study circle training to agency personnel and farmers to organize several regional study circle groups. A study circle is a simple process for small-group deliberation. By participating in study circles, people gain "ownership" of the issues, a recognition that there can be a connection between personal experiences and public policies, and a deeper understanding of their own and others' perspectives and concerns. The Chapter 3 Planning Committee felt that through the use of study circles we could expand and enhance dialogue regarding sustainable agriculture. Our first step was to provide study circle training with the goals of: 1) creating a cadre of people who are prepared to organize and lead small discussion groups on sustainable agriculture, and who will have had experience with such leadership, and 2) providing opportunities for people from different perspectives and roles who are interested in sustainable agriculture to hold structured discussions on sustainable agriculture.

A training session was held on Dec. 6-7, 1995 at the Inn at Eagle Creek, Lake Shelbyville. Participants had firsthand experience both as members and as leaders of study circles and discussed issues of start-up, effective leadership, framing discussion questions, and handling controversy. As a result of the training, study circle facilitators were prepared to help local groups: establish guidelines and shared expectations, select its topic and frame questions for productive discussions, shape the discussion, manage conflict, and bring discussion to a useful conclusion. Study circles are presently being held by the following groups: Advocates of Practical Farming and DeKalb County NRCS and SWCD; Black Prairie Sustainable Agriculture Association and Christian County SWCD; Monroe County Study Circle (Edwardsville Extension Center); Southern Illinois Study Circle (Marion Extension Center and Dixon Springs Ag Center); Southeastern Illinois Study Circle (Southeastern Illinois

1996 & 1997 State Sustainable
Agriculture Coordinator:
Richard Warner
Interim Assistant Director
Agriculture Experiment Station
211 Mumford Hall
1301 W. Gregory
Urbana, IL 61801
217-333-0240
217-333-5816 (fax)
dickw@uiuc.edu

continued ...



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Illinois

continued ...

Sustainable Agriculture Association and the Jasper County CES); Western Illinois Study Circles (Western Illinois Sustainable Agriculture Society, Western Illinois University, and Quincy and Adams County CES); and the Illinois Stewardship Alliance.

As part of our study circle efforts, 21 people took a trip to Ames, Iowa, on July 16-18 to attend the Soil Quality Workshop. During the trip we had tours and met with staff of the Leopold Center, the USDA National Soil Tilth Lab and the Ames Water Pollution Control Facility. We also had the opportunity to meet with staff and members of the Practical Farmers of Iowa. Participants included farmers, researchers, students, farm managers, and CES and NRCS personnel.

The second focus of our Chapter 3 efforts has been the development of an Agroecology/ Sustainable Agriculture homepage (<http://www.aces.uiuc.edu/~asap>). The homepage includes information about the sustainable agriculture program at the University of Illinois, training and education, regional study circles, Illinois Soil Quality Initiative, research activities, calendar of events, publications and other resources.

The third focus includes our leadership and participation in the Indiana NCR SARE PDP project: Experiential Co-Learning for Professional Development in Sustainable Agriculture. This multi-professional, interdisciplinary educational project to be conducted as a prototype in Indiana and Illinois, will help agricultural researchers, extension educators and other advisors evaluate practices and systems from the viewpoint of the farmer.

The fourth focus of our Chapter 3 activities has been the development of a training program in Holistic Resource Management (HRM). Introductory workshops were held in December in Mt. Vernon and Springfield. Intensive HRM training will be provided during 1997 with four days of training to be held in February, March and November.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Indiana

The Indiana Strategic Plan for Sustainable Ag focuses on “awakening” the Indiana agricultural community to the comprehensive manner of decision-making and the multitude of agricultural production and marketing tactics that are opportunities for the agricultural industry to consider under the umbrella of sustainable development. To achieve this objective, initial professional development activities must provide a fundamental understanding of the decision-making processes and the alternative production, processing, and marketing systems which are the foundation of sustainable agriculture. In order to communicate this information most effectively to farm families, the invited participants should include staff from the Cooperative Extension Service, the Natural Resources Conservation Service, and various agricultural businesses as well as agricultural leaders.

To this end, the Purdue University Cooperative Extension Service has collaborated with its agency partners to provide three informal, professional development activities during the past year: 1) Holistic Resource Management Workshop: Coordinated by Steve Bonney, President of the Indiana Sustainable Ag Association. Some 30 agency staff and producers participated in a three day focus on whole-farm planning. The session was held in mid-March; 2) Grazing Management Workshop: Extension Forage Specialist, Keith Johnson, and staff from NRCS collaborated on providing a training session entitled, Introduction to Management Intensive Grazing Systems. About 40 CES and NRCS staff participated in the September workshop. The focus of the workshop was to provide a) an overview of intensive grazing systems and b) details of requirements needed to make various systems operative and successful; 3) Alternative Crops Field Days. As farm families evaluate family goals and their available resources, they typically seek information regarding enterprises which may enhance family incomes by supplementing the use of available resources. An alternative crops field day was held at the Southeastern Purdue Ag Center in June. Some 30 CES and NRCS staff participated in the field day presented by Extension Horticulturist, Jim Simon, and ANR Educator, Roy Ballard. Focus of the field day was on the production of field grown vegetables and specialty crops.

Additional informal educational opportunities are being planned for 1997 and 1998. Topics will include additional information related to those held in 1996 as well as regarding composting, public markets, productive buffer strips, bio-control systems, and comprehensive whole-farm planning.

1996 & 1997 State Sustainable Agriculture Coordinator:

David Petritz
Assistant Director
Ag and Natural Resources
Cooperative Extension Service
106 Ag Administration Bldg.
Purdue University
West Lafayette, IN 47907-1140
317-494-8494
317-494-5876 (fax)
bpv@mace.cc.purdue.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Iowa

The Iowa Sustainable Agriculture Strategic Plan was developed in 1995 through a survey of 346 citizens and a planning session attended by 34 participants. An annual Sustainable Agriculture Summit was established in 1996 and was attended by 34 individuals where updates and revisions to the plan were undertaken. The Strategic Plan provides guiding principles, expected outcomes, targets audiences, and lists 13 goals for sustainable agriculture in Iowa.

Major accomplishments in 1995 were the development and delivery of six days of formal sustainable agriculture training, which were attended by more than 180 Extension field and campus staff, researchers, NRCS personnel, producers, and nonprofit representatives.

Iowa's training programs are conducted in partnership with Practical Farmers of Iowa, the Leopold Center for Sustainable Agriculture, and NRCS.

Two tabletop displays on sustainable agriculture were developed in 1995 (General Sustainable Agriculture and Community Supported Agriculture). One major publication, *Community Supported Agriculture*, was developed. Two-hundred copies of on-farm research reports from the Thompson farm (Boone, Iowa) were delivered to local Extension Offices. A calendar of sustainable agriculture events was developed for communication with staff and clients. Two comprehensive training manuals were developed for use in training programs.

Four SARE producer grants were awarded to producers and four research and education projects were awarded to researchers. A three-state Teamwork Tour of producers in Minnesota, Wisconsin, and Iowa was conducted with more than 60 participants attending (PDP-funded).

Major training events included: Two three-day sustainable agriculture training events conducted for Extension and NRCS staff. More than 180 staff attended. Ninety-five percent of attendees would recommend training to others and felt that information was up-to-date; A one-day workshop on swine management options with 231 participants; and Sustainable agriculture education on composting and swine management systems at the 1995 Farm Progress Show, which was attended by 86,000 citizens.

1996 & 1997 State Sustainable
Agriculture Coordinator:
Jerry DeWitt
2104 Agronomy Hall
Iowa State University
Ames, IA 50011-1010
515-294-1923
515-294-9985 (fax)
x1dewitt@exnet.iastate.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Kansas

1996 State Sustainable Agriculture Coordinator:

Hans Kok
Department of Agronomy
2014 Throckmorton Hall
Kansas State University
Manhattan, KS 66505
913-532-5776
913-532-6315 (fax)
hkok@oz.oznet.ksu.edu

1997 State Sustainable Agriculture Coordinators:

Daryl D. Buchholz
Extension ANR
Cooperative Extension Service
123 Umberger Hall
Kansas State University
Manhattan, KS 66506-3401
913-532-5838
913-532-5839 (fax)
dbuchhol@oz.oznet.ksu.edu

Rhonda Janke
Department of Agronomy
2014 Throckmorton Hall
Kansas State University
Manhattan, KS 66506-5504
913-532-5776
913-532-6315 (fax)
rjanke@oz.oznet.ksu.edu

A three-phase program is being implemented in Kansas. Phase I was completed in the fall of 1995 and included an orientation session at the AES/CES annual conference. Two farmers, a county agent, and a KSU Extension Specialist presented examples of sustainable ag in the real world and answered questions. During Phase I, all county offices received a copy of the Sustainable Agriculture Network's (SAN) Sustainable Ag Directory of Expertise, as well as periodic announcements of planned programs for Phase II.

Phase II consisted of the "Innovations of Agriculture" tours. Two-day bus tours were held in April, May and September 1996 in three different regions of Kansas, and a fourth is planned for April 1997. The attendance goal is 50 percent of all county agents and NRCS district conservationists in each respective area. State Extension specialist and various ag agency employees are also invited, and have been well represented on the tours. Tours were attended by 40, 24, and 46 people in South Carolina, Nebraska, and western Kansas. Learning goals included: 1) gain a practical understanding of sustainable agriculture at the farm level; 2) know where to go for more information on sustainable ag for clients; 3) gain an appreciation for the importance of crop rotation, cover crops, and soil quality in sustainable ag farming systems in Kansas; and 4) understand how guiding philosophies, long-term goals, whole-farm planning and resource management are all interrelated on these sustainable ag farms. Resource notebooks were given to all participants and included sections of readings, case studies, economic analyses, and resources available through the National Ag Library, and ATTRA, as well as KSU and other land grants.

Phase III is planned as a series of in-depth workshops for a self-selected group of 20 plus CES, NRCS, and agency personnel. About two weeks of training, anticipated to be spread out over two years, will include additional farm tours, workshops, and case study development. A semester long distance learning course is scheduled for spring 1997 as one opportunity for agents, farmers, and others called "Whole-Farm Planning Using Indicators of Sustainability - A Survey of Tools." So far about five people from each of the Phase II tours have expressed interest.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Michigan

The Michigan Integrated Food and Farming System Collaborative (MIFFS), Michigan Agricultural Stewardship Association (MASA), Organic Growers of Michigan (OGM), Michigan Organic Food and Farm Alliance (MOFFA), the North Central Region Sustainable Agriculture Research and Education Program (NCR SARE) and the USDA Natural Resources Conservation Service (NRCS) are six programs/organizations that MSU Extension interacts with on a regular and formal basis in relation to sustainable agriculture.

MSUE has played an important role in the development and implementation of MIFFS. Until its recent expansion, this Kellogg Foundation-funded project has consisted of five innovation sites: Stewardship Plan for Water Quality, Intensive Rotational Grazing, Livestock Manure Composting, Direct Marketing to Urban Consumers, and Protecting Farmlands from Urban Sprawl.

Nineteen Ninety-Six was the 17th year that MSU College of Agriculture and Natural Resources, MSUE and the Michigan Agricultural Experiment Station have provided meeting facilities and partial support for the Annual Meeting of OGM and MOFFA. The 1996 program featured sessions on "Rescuing Traditional Food Crops in the United States, Eastern Europe and the Former Soviet Union," "Where is the Culture in Agriculture?" and a play about Rachel Carson entitled "A Sense of Wonder". Workshops included seed saving, pesticides-cancer, food security and getting organic food into mainstream institutions.

MSUE had a significant role in the organization of MASA, and continues this involvement in many ways. In both 1995 and 1996, MSUE entered into a formal Cooperative Agreement with MASA for the training of MSUE and NRCS personnel in the philosophy, practices and systems of sustainable agriculture. The Michigan Sustainable Agriculture Professional Development Program will be an integral component of the overall MSUE in-service training and NRCS Career Enhancement Programs. Initially, it will consist of 15 training modules. The modules are being developed and implemented by teams of MSUE faculty, NRCS employees, and MASA members. All farm sector members of MASA participating in the program as trainers or developers of educational materials will be reimbursed for travel expenses and provided honoraria.

1996 & 1997 State Sustainable
Agriculture Coordinator:
George Bird
Department of Entomology
Michigan State University
East Lansing, MI 48824
517-355-3890
517-353-4354 (fax)
bird@msue.msu.edu

continued ...



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Michigan

continued ...

MSUE has been active in the NCR SARE program. There are two MSUE employees that serve as members of the NCR SARE Administrative Council, two MSUE employees serve as members of the NCR SARE Technical Committee and the NCR SARE PDP Coordinator is a MSU campus-based specialist. During the past seven years, MSUE has been involved in 12 SARE Research and Education grants and 15 SARE Producer grants. Also, since the beginning of the NCR SARE Professional Development Program in 1994, MSUE employees and others participated in 11 training initiatives.

The professional development project entitled Participatory Learning Between Farms and Field Crop Area of Expertise (AOE) Team Members is designed to facilitate the advanced training component of the MSUE/MASA/NRCS Cooperative Agreement. Many aspects of MSUE are currently operated through AOE's. The campus-based specialists and the county-based educators of the Field Crops AOE were awarded this NCR SARE PDP project to undertake individual advanced training initiatives in sustainable agriculture. In many cases these will be multi-year endeavors, and most will be done on Michigan farms. At the conclusion of these programs, the participating Field Crops AOE Team members will be qualified to serve as "trainers of trainers" in specific areas of sustainable agriculture.

Sustainable agriculture organization development, rotational grazing, cover crops, composting, nutrient testing, integrated pest management and farm management have been selected from the numerous activities reported by MSUE employees for special discussion.

Perhaps the most important development in sustainable agriculture in Michigan is the development of new farmer-based organizations. These are generally based on local needs and extend well beyond the rotational grazing organizations described earlier in this report. The leading example of this type of activity in Michigan is the Practical Farmers of Huron County. This organization has recently received both national and international recognition for their activities. A significant amount of credit for development of this organization must be given to the local extension educator. One of the NCR SARE PDP-funded projects is designed to develop new organizations based on the Practical Farmers of Huron County model in other areas throughout Michigan. While this will be successful, none will be an exact copy of the original. Each county or region is unique, and different personalities that mandate local sustainable agriculture organizations are designed specifically for local needs.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Minnesota

In Minnesota, we are fortunate to have a number of university, government, and nonprofit groups that are working on sustainable agriculture issues and that are conducting workshops on these issues. Since there are numerous training opportunities for extension and NRCS personnel, our primary approach has been to use SARE block grant funds to cosponsor activities with other groups, to try to link groups and individuals who are interested in the same issues, to publicize training opportunities, and to provide scholarships for extension, NRCS, and other information multipliers to attend training events. A partial list of our Minnesota collaborators includes the Minnesota Institute for Sustainable Agriculture, the University of Minnesota Program for Decision Cases, the Minnesota Department of Agriculture, the Sustainable Farming Association, the Land Stewardship Project, the Minnesota Food Association, and the Sustainable Resources Center. We also work with sustainable agriculture coordinators and organizations in neighboring states.

Part of our effort and SARE funds go into the University of Minnesota Extension Service Sustainable Agriculture Newsletter. This monthly newsletter goes to all University of Minnesota Extension offices, a number of University of Minnesota departments, and a large number of other citizens and organizations in the upper Midwest. Additional support for the newsletter comes from the Minnesota Institute for Sustainable Agriculture and the University of Minnesota Extension Service.

Some key training activities in which Minnesota extension faculty and NRCS personnel participated in 1996 included: 1) The regional "Shared Leadership, Shared Responsibility" workshops. We took one van-load of Minnesotans to the Wisconsin workshop and a second van-load to the North Dakota workshop; 2) The three-state (Iowa, Wisconsin, and Minnesota) Team-Work Tour. Educators were encouraged to team up with farmers for this tour and discussion of sustainable agriculture; 3) Decision case workshops. Workshop participants learned about sustainable agriculture and about using decision cases as a teaching tool by participating in the decision case; and 4) Holistic Management workshop organized by the central Minnesota chapter of the Sustainable Farming Association.

**1996 & 1997 State Sustainable
Agriculture Coordinator:**

(Donald P. Olson,
retired October 1996)

William F. Wilcke

204 Biosystems and Agricultural
Engineering Bldg.
1390 Eckles Ave.

University of Minnesota
St. Paul, MN 55108

612-625-8205

612-624-3005 (fax)

wwilcke@mes.umn.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Missouri

The Missouri statewide strategic plan for extension programs in sustainable agriculture, "Sustaining People through Agriculture," was developed by a diverse group of 43 extension constituents and extension workers with input from 146 additional people solicited through eight regional listening sessions held around the state of Missouri in the spring of 1995. The plan may be summarized as follows:

Program Goal: To sustain a desirable quality of life for people through agricultural systems that are ecologically sound, economically viable, and socially responsible. *Overall Objective:* To help Missouri's farm families and rural residents sustain successful farms and rural communities through use of information and knowledge. *Specific Objectives:* To sustain profitable farming operations by relying more on productivity of the people who farm and less on purchased inputs and industrial farming methods; To sustain family farms, independent food producers, and viable rural communities as essential elements of a socially responsible agriculture; To sustain, conserve, and protect the productivity and quality of soil, water, and other natural resources upon which long run agricultural productivity depends; To sustain local and regional food systems that are ecologically sound, economically viable, and socially responsible.

Organized professional development opportunities include collaborative programs with other organizations, participation in North Central Region workshops at levels over and above those supported by the regional project, and sustainable agriculture/state-specific programs categorized as Missouri Professional Development Programs. Primary emphasis is placed on the latter for which members of the Sustainable Agriculture Extension Work Group (SAEWG) provide leadership for planning, developing, and implementing of programs. These programs address specific professional development priorities identified in the Missouri Strategic Plan for Sustainable Agriculture. The 40-plus member SAEWG is made up of 90-plus percent extension field staff and other information providers who work directly with farmers.

Nineteen ninety-six activities to which Missouri's "Sustaining People through Agriculture" contributed included: 1) Meeting of Sustainable Agriculture Extension Work Group; 2) Sustainable Agriculture Seminar, Agriculture Science Week, Focus on Missouri's Strategic Plan for sustainable agriculture and other Sustainable Agriculture related programs in Missouri; 3) North Central Region PDP "Shared Leadership, Shared Responsibility"; 4) Missouri

continued ...

1996 & 1997 State Sustainable Agriculture Coordinators:

John E. Ikerd
University of Missouri
Agricultural Economics
200 Mumford Hall
Columbia, MO 65211
573-882-4635
573-884-6572 (fax)
ssikerd@muccmail.missouri.edu

Dyremple B. Marsh
Lincoln University
106 Allen Hall
P.O. Box 29
Jefferson City, MO 65102-0029
573-681-5531
573-681-5548 (fax)



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Missouri

continued ...

Professional Development Program, "Direct Marketing for Sustainability"; 5) Missouri Professional Development Program, Southeast Missouri Alternative Agriculture Farm Tour and Organic, Food Grade Grain Production and Marketing Field Day; 6) Missouri Professional Development Program Soil Quality Seminar; 7) National Small Farms Conference; 8) Holistic Resource Management: Three-day Missouri Professional Development Program on decision-making to achieve agricultural sustainability; 9) "Sustaining Quality of Life for Families on Small Farms," carried out in collaboration with *Small Farm Today* Seminar and Trade Show; and 10) Missouri Organic Growers Annual Conference.

Members of the SAEWG were provided partial or full funding of registration and travel costs to participate in professional development opportunities of their choice. State sustainable agriculture co-coordinators reviewed proposals and gave prior approval to ensure relevance to sustainable agriculture. Persons participating in individual PDPs are expected to serve as instructors for professional development programs to be held later in Missouri.

Holistic Resource Management/Community Consensus: Bill Casey and Will Arnold were funded to attend an HRM/CC workshop in Albuquerque, N.M.

Holistic Resource Management: Bill Casey was funded to participate in HRM trainers' workshop in Ontario, Canada. Bill will soon be certified as a registered HRM trainer.

National Direct Marketing Conference: John Ellerman and Debi Kelly were funded to attend this conference in New York state to prepare them to plan, develop, and conduct the Direct Marketing organized PDP in Missouri.

Steven Covey- First Things First Program: Cynthia Crawford was partially funded to attend this professional development program in Kansas City, Mo.

Low-Investment Swine Production: J.C. Owsley and Ray Feldt were funded to visit a low-investment swine demonstration facility, Dixon Springs, Ill.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Nebraska

Elements of Nebraska's strategic plan were first incorporated into priority issue statements developed in the early 1990s. A more specific plan was developed in April 1995 when about 60 producers, natural resource leaders, researchers, educators, and representatives of agribusiness, private and government organizations attended a workshop. They identified the following priority areas for sustaining Nebraska's agriculture and natural resources: 1) Integrated animal systems management; 2) Integrated crop management; 3) Agricultural and natural resource policy; 4) Natural resource and environmental management; and 5) Community and residential environment.

Throughout the discussion and development of these priority areas there were four common themes: environmental stewardship, economic competitiveness, quality of life, and partnerships and collaborations, the same issues at the very heart of sustainable agriculture adoption. Rather than establish a separate priority area to pursue the goals of sustainable agriculture education separately from work being done in natural resources or crop or animal production, it was decided to incorporate sustainable agriculture into programming for each of the five priority areas. With these priority areas in mind, teams of educators and specialists began to develop a strategic plan for achieving the identified outcomes in each priority. These draft plans were reviewed by workshop participants and implementation began in October 1995.

Concurrently with the strategic plan development, all Extension and NRCS personnel received a survey that asked field staff to identify training needs in sustainable agriculture. Thirty extension personnel participated in in-depth interviews which focused on training needs and personal attitudes about sustainable agriculture. Based on the results of these surveys and previous discussion and planning, a team of extension specialists and educators from different disciplines, NRCS personnel, and producers, began its work in September 1995. Eight goals were set for the Nebraska state training: 1) Articulate a positive vision for Nebraska agriculture to be ecologically sound, economically viable, and socially responsible; 2) Help clients to design site-specific whole-farm systems, based on family goals and unique available resources; 3) Recognize the implications beyond farm boundaries of individual landowners' decisions, and help clients to work together toward common goals for watershed and community quality; 4) Help clients fine-tune cultural practices in crop and crop-animal systems to preserve or improve water quality for specific sites and in whole watersheds; 5) Have resources to inform diverse clients about options for alternative practices; 6) Have specific learning tools to make decisions based on environmental quality concerns; 7) Use adult learning techniques and subject matter appropriate for each audience; and 8) Share

continued ...

1996 & 1997 State Sustainable
Agriculture Coordinator:
Elbert Dickey
Assistant Dean
University of Nebraska
Cooperative Extension
211 Agricultural Hall
Lincoln, NE 68583-0703
402-472-2966
402-472-5557 (fax)
coex010@unlvm.unl.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Nebraska

continued ...

responsibility and form partnerships for planning and implementing educational programs with producers. The Nebraska training program was planned to give educators specific information on alternative practices, along with a process to consider how every practice on a farm fits with all the others to form a whole system. Training emphasized a commitment to strong partnerships among institutions and with producers. The goal of the planning team was to have 80-90 percent of Cooperative Extension and NRCS personnel attend at least one training event in 1996.

Five NRCS staff, six extension educators, seven extension specialists, and five producers participated in a three-day pilot workshop. Topics included: Farming and environmental quality – implications beyond the farm boundary; Social systems and agroecological systems; Interactions in farming systems; Holistic Resource Management goal-setting; PLANETOR, a farm planning computer model (University of Minnesota); Other computer models for farm planning; The Farm Bill; and The NRCS whole-farm planning program.

Participants worked in interdisciplinary teams. They considered resources and production practices of an actual, local farm system, and set broad goals for farm profitability, environmental effects, and the effects of the farm upon the community. Within some given guidelines, the teams redesigned the farm system so that the farm would move toward meeting the measurable objectives. The groups suggested crop rotations, irrigation, and alternative tillage practices. The actual case farm is fairly conventional. Teams used PLANETOR to model the economic effects of changes they made to production practices on the farm. Based on evaluations and comments from this pilot event, the workshop was redesigned by a team from Extension, NRCS, and the Nebraska Sustainable Agriculture Society. Four more workshops were held. In total, 54 CE faculty, 33 NRCS personnel and 10 others attended the five workshops.

Action plan team leaders met with NRCS representatives to: 1) plan how Extension and NRCS can complement one another, particularly in whole-farm planning; and 2) explore how individual educational programs can include more sustainability concepts by considering farm and communities as interrelated. The group also toured an NRCS whole-farm planning pilot site in southern Nebraska. This group is planning future cooperative programs. Representatives from Nebraska attended several of the SARE professional development and training sessions and integrated information into Nebraska programming. Previously, Extension and NRCS personnel have attended one another's in-service training sessions, but the Chapter 3 activities were jointly planned from the beginning, enhancing cooperation.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

North Dakota

1996 & 1997 State Sustainable
Agriculture Coordinator:
Darnell Lundstrom
North Dakota State University
Extension Service
P.O. Box 5437
Fargo, ND 58105-5437
701-231-7173
701-231-8378 (fax)
agnrdir@ndsuent.nodak.edu

1997 State Sustainable
Agriculture Coordinator:
Tom Hanson
NDSU Extension
Rt. 3, Box 174
Minot, ND 58701-9516
701-857-7679
701-857-7676 (fax)
thanson@ndsuent.nodak.edu

NDSU Extension Service's Strategic Plan focused on increasing the knowledge and understanding of sustainable agriculture by extension staff. The plan also focused on the application of this knowledge and understanding. Both general and specific training opportunities would be provided to extension staff through workshops, which were also open to other state and federal agency staff. Extension staff would be encouraged to include sustainable agriculture programming in their county and area educational efforts.

Training of North Dakota Extension Agents and Specialists has been conducted through the "Sustainable Agriculture Training Project for North and South Dakota," which has been funded by the NCR SARE Administrative Council. FY95 training involved two-day training sessions for extension staff in North and South Dakota which were conducted the last two weeks of September 1995. Three training sessions were conducted in each state. A total of 200 persons participated in the training: 170 extension staff, 17 NRCS staff, 7 persons from Soil Conservation Districts and 16 others representing various state and federal agencies and organizations. Over 95 percent of county and area agriculture and natural resources extension staff and about 80 percent of state agriculture and natural resources extension staff participated in the training. Each participant received a 3-inch thick Sustainable Agriculture Resource Handbook filled with materials relating to sustainable agriculture systems. In the evaluation given at the end of the training, 97 percent of the respondents indicated the program included helpful information that they will use. Eighty-three percent indicated they have a clearer or somewhat clearer concept of sustainable agriculture following the training.

FY96 training was also conducted through workshops for extension staff in the two states. Two-day workshops were conducted in two different locations in each state. The focus for the 1996 training was the integration of livestock into agricultural production systems, value-added agriculture and whole-farm planning. Participating in the training program were extension staff, research staff, NRCS personnel and producers from both states who use sustainable practices.

FY96 sustainable agriculture implementation funds were utilized for minigrants to encourage extension staff to highlight sustainable agriculture related programming. The \$15,000 allocated to North Dakota was utilized to fund nine minigrants. These minigrants involved topics including Using Legumes in Spring Wheat Rotations, Sustainable Beginning Farmer Retention Program, and 4-H Community Garden. Final reports for these projects are due in June 1997. In FY97 about 50 percent of the North Dakota county extension plans of work specified sustainable agriculture components. This is an increase from about 10 percent in FY95.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Ohio

In August of 1995, Ohio State University Extension developed a statewide Sustainable Agriculture Team. The development of this team builds upon a highly successful Ohio model of using interdisciplinary teams of Extension agents and specialists, researchers, ag industry leaders, and others to better meet the needs of farmers and agribusiness in Ohio. More than 30 individuals have volunteered to be contributing members of the Sustainable Agriculture Team. Nearly all agricultural disciplines and enterprises are represented on the team by Extension staff, NRCS staff, university researchers, leaders of statewide sustainable agriculture groups, and others.

The mission of the Sustainable Agriculture Team is to help farm operators identify opportunities for increasing sustainability on their farms. Instead of creating a "sustainable agriculture program," the goal of the team is to incorporate sustainable practices, ideas, approaches and recommendations into existing Extension and research programs.

The following projects have been developed by the Sustainable Agriculture Team during its first 16 months of existence:

Several training programs have been developed and others are being planned by the team, including:

- 1) A three-day tour to Michigan State's Kellogg Biological Station and cover crop research plots in northwest Ohio was conducted in October for Extension agents and other Sustainable Agriculture Team members. A similar tour is planned for the 1997 growing season;
- 2) A day-long soil health in-service was conducted in June, and a follow-up training meeting on the topic of soil health assessment tools was held. Field demonstrations on collecting soil health data are planned for the 1997 growing season;
- 3) A three-day in-service training program was developed for Extension agents in Ohio and West Virginia. A total of 33 agents participated in the program which featured farm tours, presentations by researchers, and a program on using decision case studies to help farm families make decisions;
- 4) A day-long in-service program on conducting on-farm research is planned for March 1997. This program is being offered jointly to Extension agents and research cooperators of Innovative Farmers of Ohio;
- 5) An in-service tour to the Pennsylvania Sustainable Agriculture Conference in State College, Pennsylvania is being planned for March 1997;
- 6) A comprehensive year-long in-service training program on whole-farm planning is being developed. A SARE Chapter 3 training grant has been received by the Sustainable Agriculture Team to develop this training program for Extension agents, NRCS staff, leaders of statewide agricultural commodity groups, leaders of sustainable agriculture groups, and representatives of other

continued ...

1996 & 1997 State Sustainable Agriculture Coordinator:

Stephen Baertsche
Assistant Director

Ag and Natural Resources

Ohio State University

Extension

Ag Administration Bldg.

Room. 32

2120 Fyffe Road

Columbus, OH 43210

614-292-4077

614-292-3747 (fax)

baertsche@agvax2.ag.ohiostate.edu

1997 State Sustainable Agriculture Coordinator:

Mike Hogan

Carroll County

Extension Office

Courthouse

119 Public Square

Carrollton, OH 44615-1498

330-627-4310

330-627-6656 (fax)

hogan.1@osu.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Ohio

continued ...

agricultural agencies; 7) The Sustainable Agriculture Team is participating in the planning of a three state SARE and Kellogg IFS conference planned for winter 1997. Also, books, videotapes, and various other educational resources on sustainable agriculture topics have been evaluated for their use in Ohio, and have been purchased for all Extension agents and Sustainable Agriculture Team members. A part-time information coordinator has been hired to help Extension agents access on-line information on topics for which written materials are not available in Ohio. This "virtual reference librarian" obtains information on-line in response to requests which Extension agents get from the public. Additionally, team members are developing new resources. A fact sheet on the topic of conducting on-farm research has been developed, and a soil health assessment guide is currently in progress.

Additionally, a quarterly newsletter has been developed to help make extension agents, Sustainable Agriculture Team members and others aware of various sustainable agriculture issues, resources, events, and ideas. The newsletter is distributed to all extension agents and specialists, Sustainable Agriculture Team members, and others who have expressed an interest in receiving it. A comprehensive electronic calendar of events related to sustainable agriculture has been developed. The calendar listing is sent to all Extension agents, Sustainable Agriculture Team members, and others who have expressed an interest in receiving it. An electronic mailing list has been developed for the Sustainable Agriculture Team. The email list provides a forum for Sustainable Agriculture Team members to communicate and share ideas about sustainable agriculture topics.

Several promotional tools have been developed by the Sustainable Agriculture Team to help make farm operators in Ohio more aware of various sustainable agriculture topics. Statewide news releases and radio programs have been developed to make farmers aware of the availability of the SARE producer grants. A high-quality display on sustainable agriculture has been developed and utilized at agricultural programs throughout the state. An article on the Sustainable Agriculture Team was developed for *Ohio State Agriculture*, a tabloid publication distributed to farmers, agribusinesses, OSU Alumni and others.

The Sustainable Agriculture Team is attempting to more closely partner with organizations and agencies which have a common interest in promoting sustainable agriculture. Leaders of statewide sustainable agriculture organizations have become contributing members of the Sustainable Agriculture Team and Extension agents have begun to share their expertise by teaching at farm tours and other programs sponsored by these organizations.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

South Dakota

1996 & 1997 State Sustainable
Agriculture Coordinator:
Larry Tideman
South Dakota State University
Extension Service
152 Ag Hall
Brookings, SD 57006
605-688-4147
605-688-6347 (fax)
tidemanl@mg.sdstate.edu

Activities in 1995 as previously reported included participation in regional planning and training workshops, participation with the Northern Plains Sustainable Agriculture Society's summer tour and winter meeting, and the first year of the Sustainable Agriculture Training for Extension, NRCS and others.

Participation in the North Central Sustainable Agriculture Planning Workshop, held at Allerton Farm near Monticello, Ill., occurred in February 1996. The training coordinator, nonprofit representative, and two county agents providing extensive sustainable agriculture programming and also participated in a Train-the-Trainer Workshop in July at Carrington, N.D.

Extension staff continued to be involved with the programs conducted by the Manitoba-North Dakota Zero Till Association and the Northern Plains Sustainable Agriculture Society. A tour of North Dakota Extension agents and research center staff went to South Dakota in August. They toured the nationally acclaimed Mortenson ranch near Pierre where the Holistic Resource Management decision-making model is employed. The Dakota Lakes Research Farm near Pierre was also visited where no-till research is conducted by Duane Beck of SDSU. The farm, however, is owned and governed by a board of farmers. Those participating gave very favorable evaluations of this tour. The tour was made possible by an out-of-state tour grant given by the North Central Region at Lincoln, Neb.

Two-day training sessions were held in Dickinson and Carrington, N.D., and Pierre and Brookings, S.D. These training sessions covered topics that had not been covered in 1995, especially dealing with livestock and crops integration and value-added ventures including cooperative development. The training also built on the training received in 1995. Staff from NDSU, SDSU, NRCS at Bozeman, Mont., University of Minnesota, the Council for Cooperative Development, and the Burdick Center for Cooperatives were utilized as instructors. Producers involved in developing coops or recently formed coops gave insight to the process. Discussion regarding large hog developments and cooperative development was especially extensive.

Evaluations received indicated an appreciation for the training given but also a need and desire additional training in the future. Outcomes from the two years of training and activities include: 50 percent of North Dakota agriculture agents plan of work having a sustainable agriculture component or components of the sustainable agriculture training received. In SDSU program planning, five of 11 major program issue areas reflect sustainable agriculture. These were submitted by county staff. Both states have offered highly popular mini-grant programs.



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Wisconsin

Activities related to sustainable agriculture continue to increase both on University of Wisconsin campuses as well as within Wisconsin's six Extension districts. Primarily rural districts are showing leadership in management intensive rotational grazing, while educators in urbanizing areas are grappling with questions common at the urban/rural fringe. Key players at the campus-level are the Nutrient and Pest Management Program (NPM) and the Center for Integrated Agricultural Systems (CIAS). Topics covered include grazing, cropping systems, and food systems. WICST (Wisconsin Integrated Cropping Systems Trials), a long-term multi-disciplinary project cosponsored by the Michael Fields Agricultural Institute, UW-Agronomy, CIAS, CES and farmer collaborators, conducts research and outreach on six cropping and livestock systems.

The Cooperative Extension Sustainable Agriculture Task Force met regularly throughout 1996, on: 1) surveying various target groups; 2) finalizing a strategic plan for professional development; 3) hiring a sustainable agriculture coordinator; and 4) developing curricula for professional development opportunities. Members of the Task Force, district liaisons for sustainable agriculture, and the newly-hired coordinator attended "Train the Trainer" workshops and participated in a three-state bus tour.

In the districts, issues of interest are management intensive rotational grazing (IRG), farm planning, and land use. A number of Extension educators are helping to coordinate farmer networks, pasture walks and winter meetings on sustainable livestock production. Farm planning focuses on financial planning and family goal-setting. Extension educators in the field are aware that NRCS has taken a lead on the whole-farm planning and are interested in efforts to link economics and goal-setting with more conservation planning through whole-farm planning. Land use policy is a growing area of expertise amongst Extension educators, and the relationship between land use, marketing opportunities and other means of regional food system development is becoming a focus of efforts. In statewide efforts, Dennis Cosgrove at UW-River Falls is showing leadership on pasture improvement issues, exploring non-chemical methods. Dave Combs, Department of Dairy Science, is researching the economics of management intensive rotational grazing. UW-River Falls Extension community development specialist Larry Swain is working on Community Supported Agriculture projects in this urbanizing area.

The Wisconsin Integrated Cropping Systems Trial (WICST) is entering its seventh year of research and outreach. Its three cash grain and three forage-based systems are being compared for productivity, profitability and environmental impacts. Results to date indicate that reduced input and organic systems

continued ...

1996 & 1997 State Sustainable Agriculture Coordinator:

Patrick Walsh

Assistant Dean/Director

ANR Program Leader

University of Wisconsin

432 N. Lake St., Room 625

Madison, WI 53706-1498

608-262-1748

608-262-9166 (fax)

patrick.walsh@ces.uwex.edu



State Sustainable Agriculture Reports

Progress on North Central Region State Strategic Plans

Wisconsin

continued ...

can compete with or outperform less diverse, higher purchased input systems on most measures. In particular, profitability in the reduced input systems has been higher than in the least diverse, high input systems. This and other project information has been the basis of an active outreach program that has included dozens of activities, such as newsletters and reports, field days and farm tours, meetings, workshops, media coverage, influence on the Farm Bill, and much more.

The Center for Integrated Agricultural Systems (CIAS) continued to build multi-disciplinary, multi-professional teams consisting of faculty, farmers, and other food system professionals that have helped support district work. This year CIAS completed research on IRG activities to free resources for a broader look at low-capital dairy systems. CIAS also continued its work on the School for Beginning Dairy Farmers. The School had a very successful first year of short courses followed by internships on grazing farms. The Center produced the publication *Dairy Farmer Career Paths: Farm Entry, Exit Transitions in New Zealand and Wisconsin — Observations, Challenges, and Opportunities* for exchange as part of its research into building stronger farmer career opportunities in Wisconsin. Alternative food systems research is another area of Center research, emphasizing the importance of adding value to basic agricultural products, alternative marketing strategies, and creatively portraying the food system within the context of other societal sectors.

The Nutrient and Pest Management Program (NPM) is in its seventh season of on-farm demonstrations and education to assist farmers changing to economical and environmentally sound practices. The farmers tested recommended methods that lessen the risk of nitrate or pesticide contamination of Wisconsin's lakes, streams and groundwater. The NPM program successfully collaborated with the Wisconsin Pork Producers Association, the National Pork Producers Council, and CENEX/Land O'Lakes on a nutrient management training program for Wisconsin livestock producers. Other initiatives related to nutrient management planning included: providing technical and educational assistance to the Taylor County Land Conservation Department and four area producers on whole-farm nutrient management planning, expanding work on nutrient budgeting for grass-based dairy operations, and preparing numerous educational materials for Wisconsin farmers on nutrient management planning. NPM also collaborated with the Institute for Agriculture and Trade Policy on its Nutrient/Pesticide Yardstick Program and helped to demonstrate the prototype Nutrient Yardstick on farms in the Great Lakes Watershed. NPM again coordinated a training on pesticide issues for members of American Association of Pesticide Control Officials in conjunction with the state Department of Agriculture, Trade and Consumer Protection.



Index

A

Administrative Council 7, 12
AgLand: The Game 148
agroforestry 19, 61
alfalfa 37, 128
alley cropping 19
alsike clover 116
Amish agriculture 73, 149
animal welfare 28
Animal Welfare Institute 28
anthracnose 74
apple orchards 126, 132, 135
apple scab fungus 86
Appropriate Technology Transfer for Rural Areas 52
arthropods 132
atrazine 26
ATTRA 52
Austrian winter peas 36

B

bacterial canker 74
barley 120
basil 24
beef cattle 17, 32, 34, 53, 57, 61, 119, 129
beef cows 62, 119, 121
beef finishing systems 53, 126
beetles 44, 128
beginning farmers 63, 68, 88, 125, 129
beneficial insects 83, 132
Benton Development Group 24
big bluestem 129
Big Sioux Aquifer 76
biological control 18, 21, 27, 33, 43, 44, 48, 66, 74, 81, 86, 126, 128
bioremediation 37
birds 43, 56, 67, 85
birdsfoot trefoil 128
borderlands 22
brome 129
buffalo 127
buffer strips 26, 78, 84
business plan 35

C

cabbage 83
calving dates 62
Canada thistle 48, 128

canning 132
cantaloupe 56
Center for Integrated Agricultural Systems 82, 88, 175
Center for Rural Affairs 58, 63, 65
Center for Sustainable Agricultural Systems 61, 65, 143
chicken manure 21
chickens 38, 43, 129
cilantro 24
clover root curculio 81
Community Supported Agriculture 82, 132
compost extracts 86
composting 21, 74, 117
Conservation Reserve Program 32, 127, 129
Consortium for Sustainable Agriculture Research and Education 150
consumer relations 38, 82, 132
contributions of SARE projects 103
Cooperative Extension Service 17, 18, 19, 25, 28, 29, 32, 34, 36, 37, 39, 41, 47, 50, 53, 57, 62, 63, 65, 66, 68, 69, 72, 74, 76, 79, 80, 82, 87, 88, 138, 140, 141, 144, 145, 149, 151, 153, 154, 155, 156, 157, 166, 169
cooperatives 34, 38, 54, 78
corn 18, 27, 39, 44, 45, 56, 57, 69, 77, 80, 116, 117, 122, 129, 133
corn gluten meal 123
Cornell University 60
cover crops 18, 21, 36, 45, 69, 70, 72, 116, 133
crop rotations 18, 36, 39, 59, 61, 70, 72, 116
curriculum for sustainable agriculture 50, 52, 155

D

dairy 80, 87, 88, 135, 136
Dairy Forage Research Center 87
Dakota Rural Action 49
DeKalb Seed Company 61
dill 24
direct marketing 126, 133
ditch banks 22
Dordt College 77
Dorper sheep 118
durum wheat 130

E

education in sustainable agriculture 25, 45, 50, 68, 121, 135, 138, 140, 141, 144, 145, 148, 151, 153, 154, 155, 156, 157, 159, 161, 162, 163, 165, 166, 167, 170, 171, 172, 174, 175



Index

elderberries 127
Emporia State University 34
environmental incentive provisions 76
erosion 37, 39, 116, 134, 136
European corn borer 27
Everyone a Teacher, Everyone a Learner 138

F

Farm Bill (1990) 76
Farm Foundation 146
farm nutrient budgets 72
Farm Service Agency 32
farmer and rancher involvement 89
Farmers' Legal Action Group, Inc. 49
fence rows 22
fencing 130
field bindweed 33
filter strips 22
Fish and Wildlife Service 47, 51, 78
fish communities 84
foliar diseases 74, 86
food retailers 54
forage stockpiling 121, 125
forage systems 32, 34, 53, 57, 62, 78, 128, 130
forages 25, 45, 118, 125
Forest Service 56
free-range poultry 43
fruit rots 74
fungicide reduction 40, 41, 74, 86
future farmers 46
Future Farmers of America 29

G

gall mite 33
geese 43
grain sorghum 56, 66
Grand Valley State University 157
grass-fed meat 34, 38, 53
grazing 25, 26, 32, 47, 51, 57, 62, 84, 88, 118, 119,
121, 125, 126, 129, 130, 135, 144, 161
grazing networks 52
Great Lakes Basin Intensive Rotational Grazing Network 52
green manures 45, 116, 124
greenbugs 66
guidebook for ranchers 79

H

hairy vetch 36, 69, 133, 134
Hamline University 82
handbooks 58, 79
hardwood 19
hedgerow habitat 83
herbicide reduction 20, 21, 48, 69, 87
herbs 24
highly erodible lands 32, 119, 129
hog carcass composting 117
hog confinement operations 49
hog slaughtering 55
hogs 28, 49, 55, 123
holistic management 47, 73, 130, 149, 151, 153, 159,
161, 166
honeybees 135
hoop structure 123

I

Illinois 16, 17, 18, 45, 116, 159
Illinois No-Till Farmers Association 16
Illinois Soil Quality Initiative 16, 160
Illinois Stewardship Alliance 16
Illinois Sustainable Agriculture Network 141
Illinois Sustainable Agriculture Society 16
Indiana 19, 20, 22, 117, 141, 153, 161
Indiana Department of Natural Resources 19, 22
Indiana Sustainable Agriculture Association 21, 22, 141
indigenous knowledge 64
Innovative Farmers of Huron County 39, 149
Innovative Farmers of Ohio 68, 69, 70, 72, 172
insecticide reduction 18, 27, 44, 66, 83, 87
Integrated Crop Management 76
Integrated Farm Management program 76
internships 61, 68, 135
interseeding 131
Iowa 23, 24, 26, 27, 28, 29, 30, 32, 45, 118, 119,
145, 146, 162
Iowa Producers Cooperative 24
Iowa State University 24, 25, 26, 27, 28, 29, 30, 32,
47, 49, 50, 51, 64, 145, 146, 162

K

Kansas 33, 37, 38, 120, 163
Kansas Farmers Union 34
Kansas Rural Center 33, 36, 38, 52
Kansas State Board of Agriculture 33



Index

Kansas State University 33, 34, 36, 37, 163
Kansas Value-Added Center 34
kura clover 118

L

lambs 38
Land Stewardship Project 28, 30, 47, 49, 50, 51, 52, 82, 145, 166
land-grant institutions 46
land-use issues 148
lane construction 136
late blight 41, 74
legumes 45, 119, 128
Leopold Center for Sustainable Agriculture 32, 146, 162
lespedeza 128
Lincoln University 138, 151, 167
livestock 17, 25, 26, 28, 29, 32, 34, 38, 49, 53, 55, 57, 61, 62, 80, 84, 87, 88, 118, 119, 121, 122, 123, 125, 126, 127, 135
locally-owned value-added (LOVA) 55
Loess Hills 119

M

Macalester College 30
machine vision technology 20
machinery costs 59
management intensive grazing 32, 47, 51, 118, 119, 125, 126, 129, 135, 136, 175
Manitoba-North Dakota Zero Tillage Farmers Association 67, 140, 174
manure 21, 29, 53, 70, 74, 80, 122
market access 49
marketing 34, 38, 52, 54, 55, 126, 133, 151, 155
McGill University 68
mechanical cultivation 69
medics 45, 77
mentors 58, 61, 72, 88
Michael Fields Agricultural Institute 45, 81, 82, 86, 145, 175
Michigan 39, 40, 41, 43, 44, 45, 121, 122, 149, 155, 156, 157, 164
Michigan Agricultural Stewardship Alliance 149, 155, 164
Michigan Integrated Food and Farming Systems 164
Michigan Organic Food and Farm Alliance 164
Michigan Potato Industry Commission 41
Michigan State University 39, 40, 41, 43, 44, 45, 68, 122, 155, 156, 164

minigrants 139
Minnesota 45, 46, 47, 48, 49, 50, 51, 52, 123, 124, 145, 148, 154, 166
Minnesota Cooperative Fish and Wildlife Research Center 47
Minnesota Department of Agriculture 45, 47, 51, 148, 166
Minnesota Department of Natural Resources 148
Minnesota Food Association 46, 82, 166
Minnesota Institute for Sustainable Agriculture 30, 46, 47, 51, 52, 145, 154, 166
Missouri 53, 54, 55, 125, 126, 151, 167
Missouri Department of Agriculture 54
Missouri Forage and Grasslands Council 52
Montana State University 59
moths 33
mulches 24, 124
multiple integer linear programming model 59

N

National Center for Appropriate Technology 52
native grasses 26, 119, 127, 130
Natural Resources Conservation Service 25, 32, 37, 53, 72, 76, 78, 138, 140, 141, 144, 145, 153, 154, 155, 156, 157, 164
NC+ Hybrids 61
Nebraska 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 127, 128, 129, 138, 143, 153
Nebraska Cattlemen 62
Nebraska Holistic Resource Management 62
Nebraska Sustainable Agriculture Society 50, 58, 61, 63, 65, 153
nematodes 18
networking 36, 50, 51, 52, 58, 63, 65, 68, 72, 88, 125
new farmers 88
nitrogen applicator 122
nitrogen fertility 29, 70, 80, 122, 133
no-till 48, 69, 131
nonprofit group involvement 92
North Central Region Center for Rural Development 30, 64, 146
North Dakota 67, 130, 131, 140, 154, 171
North Dakota State University 67, 81, 140, 148, 154, 171
Northern Great Plains 67
Northern Plains Sustainable Agriculture Society 52, 67, 81, 140, 174
Northern Prairie Science Center 67
nutrient budgeting 80



Index

O

Ohio 45, 68, 69, 70, 71, 72, 73, 74, 132, 133, 144, 156, 172
Ohio Agriculture Research and Development Center 70, 71, 72, 73
Ohio Department of Agriculture 156
Ohio Ecological Food and Farm Association 68
Ohio State University 50, 68, 69, 70, 71, 72, 73, 74, 138, 156, 172
oilseed rape 18
on-farm demonstration 17, 19, 27, 28, 29, 32, 47, 77, 155, 156
on-farm learning center 121
on-farm monitoring tools 51
on-farm research 23, 36, 39, 43, 45, 68, 69, 70, 71, 72, 155
orchard mason bees 135
organic agriculture curriculum 155
Organic Growers of Michigan 164
organic systems 38, 48, 61, 67, 71, 116, 121, 123, 126, 155
Osage Independent Pork Producers Association 55
outreach components of projects 97
overseeding 134

P

packer concentration 49
parsley 24
pasture renovation 136
pastured hogs 123
pastured poultry 129, 133
peas 131
pest control 21, 27, 43, 44, 56, 66, 71, 83, 126, 132
Pioneer Hi-Bred International 61
plant breeding 120
plant health 71
plum curculio 126
plums 127
potatoes 41, 87
poultry 43, 117, 129, 133
poultry manure 21
Practical Farmers of Iowa 23, 27, 52, 77, 145, 162
Prairie Pothole Region 78
PrairieFire Rural Action 49
processing 35, 54
producer involvement in projects 89

profit maximization 59

Purdue University 19, 20, 21, 22, 141, 153, 161

Q

quality of life 30, 51, 60, 73, 82, 150, 151, 156, 167

R

rangeland 79
raspberries 123
red clover 128
ridge tillage 23, 57
right-of-ways 22
riparian areas 56, 84
riparian management system 26
roadsides 22
Rodale Institute 45
rural communities 31, 32, 52, 60, 63, 65, 82, 146, 150, 167
rural highways 20
rural women 65
rye 21, 116, 121, 134

S

saline seeps 37
sandy soils 122
SARE 4
SARE staff 5, 6
School for Beginning Farmers 88
schools, secondary and elementary 29, 52, 84
septoria 74
sheep 118
shelter belts 22, 56
shrubs 26
Sierra Club 16
slaughtering 55
Small Farm Today 151
smother crops 45
soil 70, 116, 134
soil bioengineering 26
Soil Doctor 122
soil management 71
soil nitrate test 29, 133
soil quality 16, 39, 67, 77, 134
South Dakota 75, 76, 77, 78, 79, 134, 140, 154, 174
South Dakota State University 75, 76, 77, 78, 79, 140, 174
Southern Iowa Forage and Livestock Committee 32



Index

soybeans 45, 48, 56, 69, 116, 129, 134
spirituality 31
stem mining weevils 128
Stratford Ecological Center 68, 72
stream ecology 26, 84
strip cropping 116
study circles 159
sunflowers 67, 134
surveys 30, 54, 60, 64, 130
sustainable farmers 46
Sustainable Farming Association of Minnesota 45, 47, 52, 154, 166
Sustainable Resources Center 166
Swedish-style hog system 28
sweet clover weevil 81
switch grass 129
systems research 146, 153, 154

T

team projects 47, 51, 149
tillage systems 23, 39, 40, 57, 67, 70
timber 19
tomatoes 40, 74
train-the-trainer workshops 138
turkeys 117

U

university courses in sustainable agriculture 50
University of California-Davis 43
University of California-Sacramento 72
University of Georgia 70
University of Illinois 16, 17, 18, 30, 141, 159
University of Minnesota 28, 45, 47, 48, 50, 51, 148, 154, 166
University of Missouri 53, 54, 55, 72, 151, 167
University of Nebraska 50, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 138, 143, 169
University of Northern Colorado 50
University of Wisconsin 80, 81, 82, 83, 84, 86, 87, 88, 150, 175
Upper Midwest 25, 82, 116
urban communities 82
urban waste composting 117

V

value-added products 34, 54, 55
vegetable production 21, 83

vertical coordination 49
videotapes 25, 28, 154

W

W.K. Kellogg Foundation 146
Wallace Institute for Alternative Agriculture 146
water quality 26, 76, 78, 84, 116, 122, 124, 157
Water Quality Incentive Program 76
Water Resources Institute 157
watering systems in paddocks 119
watershed teams 155
weed control 20, 21, 24, 32, 33, 43, 44, 45, 48, 69, 77, 116, 123, 124, 128
weevils 81, 128
Western Corn Belt 60
western rangeland 79
wetlands 26, 75, 78
wheat 36, 37, 56, 67, 116, 124, 130
whole-farm planning 52, 61, 72, 73, 143, 153, 156, 157, 175
wildflower seed crops 124
wildlife habitat 26, 44, 56, 67, 75, 78, 84, 130
windbreaks 22, 56
winter barley 120
winter wheat 124
Wisconsin 45, 80, 81, 82, 83, 84, 86, 87, 88, 135, 136, 145, 150, 155, 175
Wisconsin Department of Natural Resources 84
Wisconsin Geological and Natural History Survey 80
Wisconsin Integrated Cropping Systems Trial 135, 175
Wisconsin Technical College Systems 88
women 65
World Wide Web pages 43, 159, 160

Y

yellow mustard 131
youth 29, 61, 68, 135



NATIONAL AGRICULTURAL LIBRARY



1023122101

1984-85
1985-86
1986-87